REPORT

OF THE

CANAL COMMISSIONERS

OF

PENNSYLVANIA,

RELATIVE TO THE

PENNSYLVANIA CANALS

AND

RAIL-ROADS.

Read in Senate, December 3, 1835.

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1835.

REPORT

OF THE

CANAL COMMISSIONERS.

CANAL COMMISSIONERS ROOM,

December 2, 1835.

His Excellency George Wolf,

Governor of Pennsylvania,

Sir—By order of the Board of Canal Commissioners, I have the honor of transmitting to you their annual report for the year ending the first of November last, and the accompanying documents.

JAMES CLARKE,

President.

The Canal Commissioners respectfully submit their Annual Report.

In laying before the Legislature an account of the operations on the public works of the State for the past year, as well as of their present condition, it is with no ordinary feelings of gratification that the Canal Commissioners are able to congratulate their fellow citizens on the signal success which has attended our system of internal improvements.

After nine years of unremitted toil and untiring perseverance in the construction and completion of upwards of six hundred miles of canal and slack-water navigation, and nearly one hundred and twenty miles of rail roads, Pennsylvania has placed herself on an eminence from whence she may view without any apprehension of successful rivalry, the emulous exertions of her sister states in similar enterprises.

The success which has attended the State improvements, yet but in their infancy, has stimulated incorporated companies to embark in similar works—there being at this time completed, or in a course of construction, about four hundred miles of canal, and five hundred and twenty miles of railroad belonging to companies, thus swelling the aggregate to *one thousand miles* of canal, and six hundred and forty miles of railroads within the Commonwealth. Of such unrivalled achievements within so brief a period, the citizens of Pennsylvania have reason to be proud, as well for the incalculable benefits which they have and will continue to produce, as for the admiration with which they are viewed by strangers and travellers.

No serious accident or casuality has occurred on the public improvements, to interrupt the trade or travel since the last annual report. The tolls collected and paid into the Treasury within the fiscal year, ending on the 31st of October 1835, exceed those received in 1834, $374,568 62.

Amount received on canal,	$403,008 43
On rail roads,	194,623 24
For motive power,	86,726 10
Total,	$684,357 77

While the friends of the system have every reason to be satisfied with the proceeds of our infant improvements for the past year, inasmuch as they exhibit indubitable evidence of increasing prosperity, and while the timid may now rest satisfied that the revenue derivable from the canals and railroads of the Commonwealth, will within a few years pay the interest, and ultimately discharge the principal borrowed for their construction, it may be necessary here to remark, that the amount of tolls received last year would have been greatly increased, but for the following causes.

1st. The unusual severity of the weather throughout last winter and its continuance until late in the spring, which postponed the opening of the canal from fifteen to twenty days later than was expected.

2d. When the navigation did open, those engaged in the transportation were not sufficiently prepared to carry all the goods offered.

3d. The want of a sufficient number of locomotives on the railway, which could not be procured, partly from the delay in making an appropriation by law for their purchase—and partly on account of the limited number of persons engaged in making them in this country, and the number bespoke from the best manufactories by companies when the law making the appropriation passed.

4th. In the law authorising the agents of the Commonwealth to provide motive power for the rail road, they had no authority given them to employ horses between the inclined planes on the Columbia railway.

In consequence of these several causes, vast quantities of goods

destined for the west were conveyed by waggons on the turnpikes from Philadelphia to Pittsburg, instead of passing over the canals and railways.

The difficulties which have heretofore perplexed the Canal Commissioners during the progress of the great work, whether arising from legal restrictions, pecuniary embarrassments, or natural obstacles, have all passed away, and henceforth the management of the public improvements will be comparatively easy. The canals and railroads with few exceptions are in excellent order. Rules and regulations for their government, protection and use, have been digested, adopted, and enforced. Economy and vigilance have been required from all the public agents employed by the Board, and almost every thing pertaining to the improvements, has been reduced to an exact system.

The following table will exhibit the business on the canals and rail roads of the state since they were first opened for public use:

Years.	No. of Boats.	No. of Cars.	No. of miles travel'd by passengers.	Amount of tolls received.
1830				$27,012 90
1831				38,241 20
1832			152 788	50,909 57
1833			878 315	151,419 69
1834	664	349	4,085 191	309,789 15
1835	760	774	11,231 924	684,357 77
			Total	$1,261,730 28

The rates of toll originally charged on the Pennsylvania improvements, have been from time to time revised and reduced.—The rates last established, took effect on the first day of last February. In establishing this tariff of tolls, especial care was taken to encourage and promote the agricultural and manufacturing interests, so far as it could be done consistent with the demands of the Treasury, and the Board had reason to believe, that the merchants, traders and farmers, were at the time generally satisfied. Still, however, as tolls operate as a tax on articles charged, there are and always will be, interested men, who are unceasing in their importunity to have a reduction of the toll on the articles they produce, or transport, which, if granted to the extent of their wishes, would soon cripple the Treasury, and render a continuation of direct taxes necessary to sustain the faith of the Commonwealth.—The Board have no hesitation in saying, that but little if any reduction in the rates of toll ought to be made at present. Further time and the completion of several works of internal improvement now in progress, which connect with our canal and railways, will secure an ample commerce without sacrificing the revenue to produce a precotious prosperity.

COLUMBIA RAILWAY.

Since the second track on the Philadelphia and Columbia railway was opened for public use on the 7th of October, 1834, the road has been kept in good order, and the trade upon it uninterrupted, except for a few days last winter, in consequence of a deep snow.

The new work in progress at the date of the last report, has all been completed. The site for an engine house for locomotives, machine-shops, and other buildings and fixtures necessary for the repair of engines belonging to the Commonwealth, was finally fixed at Parkesburg, Chester county, which place was selected instead of Columbia, as originally contemplated, on account of its central situation, and because the Oxford railroad, leading to Baltimore, diverges from the Columbia road at that point. Dwellings for the workmen, and a Collector's office at this place, have not been put under contract, for want of funds.

In conformity with the act of the 27th day of February last, a double track of rails has been laid on the Columbia bridge, whereby the connection between the Columbia railway and Wrightsville, in York county, is completed. The work cost three thousand six hundred and ninety-nine dollars.

There has been paid to the city of Lancaster, in obedience to the resolution of the 26th of March last, sixteen thousand eight hundred and fifty-seven dollars and ninety-one cents.

With a view to obviate the inconvenience of inclined planes on the Columbia railway, the Engineer of the line made a survey and ascertained that the inclined plane at Columbia can be avoided by a new road of five and one-fourth miles in length, which is but one third of a mile longer than the present road. He estimates the cost of the new road if laid with a wooden track, at one hundred and thirty-three thousand, three hundred and sixty dollars, or if the rails on the present line are used, at one hundred and ten thousand dollars. While on this subject, the Board would respectfully suggest to the Legislature the propriety of extending a branch of the railroad to the borough of Marietta, three miles above Columbia. This branch could be made to avoid the Columbia plane, and the circumscribed space at Columbia, for the accommodation of a great trade, seems to point out the propriety of such an improvement.

During the last summer, the Engineer, Mr. Gay, made a cursory examination of a route for a railroad from the west end of the Schuylkill viaduct, by the Gulph valley, with a view to dispense with the Schuylkill inclined plane. He considers the route practicable, but for want of time made no estimate of its probable cost. It will however be expensive, as part of the ground over which it must be carried is much broken. The whole distance for a new road would be fifteen and one-fourth miles, being about two miles

longer than the present railway. The grade however is favourable, as the ascent is only at the rate of twenty-five feet per mile.

As the local business on the railway near Philadelphia interferes with, and very much impedes the regular trade and travel on the road, the Board are of opinion that it will be necessary to construct two additional tracks from the City to the Schuylkill viaduct.

Last year contracts were entered into for fifteen locomotive engines, and at the date of the last report two of them were on the road. Ten more were expected early in the spring, but this expectation was not realized, as seven only were in readiness for the spring trade. Immediately after the passage of the act of the 27th day of February last, providing for the payment of locomotives, measures were taken by the Board for procuring five others in addition to those previously engaged. But before the law passed the number of orders for that description of engines which the manufacturers had engaged to fill on account of companies, postponed the making of those wanted by the Commonwealth until late in the season, it therefore became impossible to procure the number required for the business of the road. There were but seventeen engines on the road on the 31st of October last; of these ten were built by M. W. Baldwin, Esq., one by Coleman Sellers & Son, and one by Long and Norris, all of Philadelphia. These engines are excellent. The other five made in England by Robert Stephenson, are not as efficient as those made in this country. The remaining three engines were expected to be placed on the road in the month of November.

It is ascertained that the cost of running locomotives on the Columbia railway, is about fifteen dollars and twenty-five cents per trip of seventy-seven miles, and the majority of the American engines in their ordinary trips, draw a gross load of *seventy-five tons*. One of them has drawn *one hundred tons*, and several others from eighty to ninety tons over the highest grade on the road.

There has been a deficiency of engines throughout the season—there is not now a sufficient number for the fall business, nor will there be an adequate supply for the spring trade. The Canal Commissioners in their last annual report, asked for an outfit or contingent fund of forty or fifty thousand dollars, to defray the expenses of motive power, but it was not granted. The withholding of this sum has already produced serious inconveniences and heavy losses, and is likely to be the cause of more. The Board are prohibited by law from agreeing with the manufacturers of engines for as many as may be required next year, nor can they, for want of authority, obviate the difficulty arising from want of engines by employing horses between the inclined planes on the Columbia rail road. From fifteen to twenty additional engines will be required on this road next season; the power to contract for the use of horses at the two ends of the rail way, expires on the 4th of March next.

PORTAGE RAILWAY.

It was not until late last spring that the second track of the Portage railway was finished, and that it was not completed during the winter, was owing to the want of a quantity of iron-edge rails which were expected from England soon after the last report, but which did not arrive in Philadelphia until the navigation of the canal had closed, consequently, it could not be transported to the mountain on the public improvements, until the opening of the navigation, which was late in the spring, as already stated, and that too at a time when all the boats and cars belonging to the transporters were fully employed. These circumstances, together with the delay that occurred in providing funds for the completion of the work, and the want of a sufficient number of locomotive engines, prevented the agents of the Commonwealth from assuming the motive power on the road until the 10th of May.

All the new work which was in progress on the 31st of October 1834, or that was then contemplated to be done towards completing the road, has been finished, except the depots and machine shops at Hollidaysburg and Johnstown. The latter is incomplete, and but little progress has been made in the former for want of funds—a second set of stationary engines for the inclined planes have been procured, fixed in their places, and put to work. There are now twenty stationary engines on the road, and from the quantity of work they are able to perform, can transport all the trade over the plains that will be presented for many years.

When the navigation of the canals closed about the last of December, the ropes were removed from the planes, from which time until the 20th of March, the use of the railway was suspended. During the winter of 1833–4, the frost injured the road very little, but last winter it penetrated far below the foundation on which the stone blocks for supporting the rails are placed, raised the railway, and produced a derangement of the tracks by the irregular settling of the blocks, and the separation of the rails; this latter injury had to be remedied by the introduction of locust cross tiers, at a heavy expense. By the frost penetrating into the banks in deep excavations, much labor and cost were incurred in removing large masses of materials from the railway, which were detached from the slopes by the thaw in the spring. The sinking of the high embankments, and the raising of them to the proper height, from time to time, has been attended with considerable expense. Since the difficulties which were experienced in preparing the road for the spring trade were overcome, it has been kept in excellent order.

Before the navigation closed last fall, a locomotive engine built at Boston, was received; it has worked constantly since the 10th of May, with very little repairs, and is considered a first rate engine. On the 15th of April, two other engines were landed at Hollidaysburg from New Castle, in Delaware, where they were

built. They are not good, and have been a source of expense as well as vexation since they were placed upon the road.

The want of suitable machine shops, and necessary tools for repairing engines on both railways, was the occasion of considerable loss to the revenue, and delay in the transportation during the past season. About the 1st of September, a locomotive engine built by M'Clurg, Wade & Co. of Pittsburg, was obtained and put to work. During the short time it has been running, it has given entire satisfaction. The same company have another engine almost finished, which makes five engines in all for the Portage road. Four more will be required for the trade of the current year, but the Board have no authority to procure them.

Since the 10th of May last, the Commonwealth has furnished all the motive power on the Portage railway—on five miles of inclined planes, by stationary engines—on a level of thirteen miles, by locomotives—and on ten levels, making eighteen miles, by horses employed under contracts. The four additional locomotives required, are intended for two of those levels, which, together, are nine miles in length.

The advantages of having the moving power on a railway under the direction of one general superintendent, instead of the road being used as a highway, where every transporter finds his own power, has been fully demonstrated on the Portage. In 1834, when transporters employed men and horses to carry goods over the mountain, there was great irregularity and confusion in their movements, which the united efforts of the agents having charge of the road, could not reduce to a regular system. But in 1835, twice the business was done, and ten times as much can be done with great regularity and expedition. Last year the Commonwealth maintained the stationary power at the planes without any charge to the transporters, which, had it been charged to the trade carried over the road, would have been equal to one dollar and nineteen cents per ton. While the average amount paid by the transporters for horses and drivers to convey a ton of freight over the railway, was one dollar twelve and one half cents, making the whole cost equal to two dollars thirty-one and one half cents per ton. But since the 10th of May last, the charge for all the motive power in transporting a ton of goods over the road, is only about ninety-six cents when cars carry loads in both directions, or one dollar and twenty cents if the cars are loaded one way and return empty. The locomotive built at Boston does the work of eighteen horses, and the daily expense of running it two trips each way over a thirteen mile level, being fifty-two miles, is seven dollars and twelve and one half cents.

No provision having been made by the Legislature for purchasing ropes or for maintaining the machinery at the inclined planes, from the first of November, 1834, till the tenth of May, 1835, when the State commenced furnishing all the motive power, the expenses necessarily incurred for these objects had to be borne by

the construction fund, which was also diminished by the expense of securing the tracks of the road by locust cross-ties, and by paying claims of contractors, allowed them by the Legislature. As these expenses and claims were not included in the estimates for finishing the road, nor provided for by increasing the amount of the general appropriation, the Board were compelled to suspend the work, and postpone the completion of the depots and machine shops until funds are provided by law.

It here becomes the duty of the Board to represent to the Legislature, that if funds are not immediately provided to purchase ropes and locomotive engines, and to pay for the necessary repairs required during the winter, so that every thing may be in complete order at the opening of the canal and railways next spring, the reputation of our public works must suffer abroad, while the interests of our own citizens and the revenue of the state will be seriously injured.

For full details relative to the cost of the railways, their stationary and locomotive engines, the current expenses and all things appertaining to them, the Board respectfully refer the legislature to the accompanying reports of the engineers and superintendants.

CANAL.

Throughout the past year, the several lines of canal were generally kept in good condition. In conformity with an order of the Board, the supervisors at a small expense and little difficulty, broke the ice which had formed on the canal last fall, and kept it open for navigation until the transporters near the last of December, gave up running their boats. Measures were taken to open the canal on the 1st of March, this however could not be accomplished by reason of a prolonged winter, until from the 15th to the 25th of March; thus the trade was retarded for nearly three weeks longer than was anticipated, which has been the cause of a considerable diminution in the tolls for the past year.

Nearly all the new work in progress on the canal at the date of the last annual report, including a feeder from the Swatara at Portsmouth, is finished, and some important repairs contemplated at that time are completed. On the old lines few accidents have happened, and where breaches occurred they were promptly repaired. The principal injuries sustained by any part of the canal, took place on the new lines of Beaver, French Creek and Lycoming. A portion of the Lycoming line is constructed through an alluvial soil, of which the banks of the canal are composed. This rendered the strengthening of them necessary, and heavy walls of rip-rap, to protect them against floods in the river, had also to be built. On the 22d and 23d of October last, there was a very high freshethet in Beaver and French creeks, which injured the canals along those streams in many places. The damage done on the Beaver division, consisted principally in the partialbreaking down and washing away of the canal banks and towing path, the dams and

locks remained uninjured. French creek division, however, fared worse than the Beaver, as in addition to a more extensive injury to the towing path and embankments, one side of a lock and several dam abutments were damaged.

The inside of the canal banks on the main and Susquehanna lines were much worn during the season with waves, caused by the speed of boats carrying passengers. To remedy this injury, the banks have been lined with small or broken stone; this plan has proved an effectual protection. Much labor has been expended at this work, and a good deal more is required, which when done, will, it is believed; will prevent any further injury from the above mentioned cause.

Several lines of the canal experienced some inconvenience at times for want of a sufficient supply of water. As a remedy on the Delaware division, the North Branch division below Nanticoke, the West Branch division below Dunstown, the Susquehanna division, the Juniata division below North's Island, Long Narrows and Aughwick's dams, and the Western division below Sutton's and Leechburg dams, it is proposed to sink the canal bottom on the upper or feeder levels, at the head of the first lift lock below the respective dams, and carry the excavation up stream, diminishing the depth in ascending the canal until it terminates at common bottom. This plan will secure a sufficient depth of water at the lower end of the upper levels, which now prove deficient when drawn down rapidly to fill a long line. Besides, it will afford a much better supply than at present for all the levels below. These improvements ought to be done this winter, if the frost does not hinder the ground from being excavated.

Although no inconvenience was felt for want of water on the main line during the past season, except for about two weeks in the month of September, on the Frankstown line between Hollidaysburg and Williamsburg—yet it has become manifest that in dry seasons there will be a deficiency in the Conemaugh river and the upper part of the Juniata, for the purposes of an active trade. The necessary quantity, however, can readily be obtained by reservoirs which ought to be constructed as soon as practicable.

In their last annual report, the Board suggested the propriety of having a reservoir constructed near Johnstown for supplying the Western division with water in dry seasons, and for that purpose as well as for works then in progress, or that were necessary to be done upon old lines, asked for an appropriation of one hundred and twenty-five thousand dollars, of which about twenty thousand dollars were intended to commence the reservoir. Yet although the building of the reservoir was authorised by law, it has not been put under contract because, in the general appropriation act for new work on finished lines, and for other purposes, one hundred thousand dollars only was granted to effect the several objects contemplated. This fund of one hundred thousand dollars, although reduced below what was deemed necessary to carry out the views of the Board,

was also charged with the cost of extending the arch, and filling up the tunnel at Grant's hill in the city of Pittsburg, estimated at eight thousand four hundred and sixty-seven dollars and twenty-five cents. Other charges upon the same fund were also added, that were not anticipated by the Board in their last report.

With a view of ascertaining the best location for two reservoirs, one on the eastern and the other on the western side of the Allegheny mountain, extensive examinations and surveys were made during last summer. The site selected by the Engineer for the one on the western side, is on the south fork of the little Conemaugh. It will cover four hundred and sixty-five acres of ground, and will be capable of containing five hundred and twenty four millions of cubic feet of water, which, after making allowance for evaporation, will yield four thousand cubic feet of water per minute, for three months. A supply which, when added to the yield of the streams at their lowest stage, will be ample for the greatest demands of trade. It is estimated to cost one hundred and thirteen thousand three hundred and thirty dollars. Two sites for a reservoir have been selected on the eastern side of the mountain, both on the south fork of the Frankstown branch of the Juniata. The one furthest up stream, will cover two hundred and twenty-nine acres of land, and will hold one hundred and sixty million cubic feet of water. Estimated cost of construction, eighteen thousand four hundred and thirty dollars. The other, with a lower dam, will cover three hundred and eighty acres, and will contain two hundred and twenty-nine millions, two hundred and eighty thousand cubic feet. Estimated cost, fifty-three thousand six hundred and fifty dollars. The Canal Commissioners prefer the latter, on account of its proximity to the present feeder of the canal, and the facility with which the water can be increased to any desirable extent, by raising the dam.

A guard lock in the Long Narrows, and the superstructure of an aqueduct near Alexandria, on the Juniata division, ought to be built this winter.

Eight locks on the North Branch division were originally constructed entirely of wood. They are much decayed, and most of them will require to be replaced next season. Permanent locks of cut stone ought to be substituted. This can be done in summer without interrupting the navigation, by placing them along side of the present locks. A new guard lock should also be built at Nanticoke dam, and the one now at that place can then be used for feeding the canal, as great difficulty is experienced at present in passing water enough through the lock to supply fifty-four miles of canal, on account of its being frequently obstructed by the passage of boats, which difficulty must increase with the increase of trade.

Extensive protection walls or rip-rapping is required for the protection of the towing-path along the pool of the Nanticoke dam.

By the act of the 11th day of March last, the Canal Commissioners were directed to fill the deep cut at Grant's hill, in the city

of Pittsburg, and to extend the arch of the tunnel from its southern termination to the arch of the bridge on Fourth street. The filling of the cut is completed, but the arch is not quite done, and probably will not be finished this season.

The act directing the work at Grant's hill—the act requiring bridges over the canal and railway to be repaired or rebuilt by the agents of the Commonwealth—and the several acts relative to private claims, or extra allowances to contractors, contain provisions imposing duties and requiring disbursements, but without any means being provided to meet these objects beyond the appropriation required for other purposes. Hence it followed that some important work could not be executed, while just claims, which ought to have been paid, had to be postponed for want of an appropriation.

There are nine hundred and eleven bridges over the canal and railways of the State. Of these, three hundred and eighteen are road or public bridges, five hundred and thirty-seven farm or private bridges, and fifty-six horse or foot bridges, most or nearly all of which fall within the description that must be maintained by the Commonwealth.

The fund for repairs is exhausted, and by the time the navigation closes, the Supervisors will generally be indebted for labor and materials. It is essential to the prosperity of the public works next season, that funds should be immediately provided for repairs and for other indispensable objects. About two hundred thousand dollars is required to pay debts that are or will soon be due, and to meet the demands of a pressing character already mentioned.

By the act of the 13th of April last, the Canal Commissioners were required to extend the improvements on the West Branch of the Susquehanna to the mouth of Tangascootack. Measures were immediately taken by the Board to place as much of the work under contract as could be covered by the appropriation. This extension of the Lycoming line from the dam at Dunstown, is seven miles and one hundred and twelve perches in length. It consists of two dams in the river, having an aggregate lockage of sixteen feet six inches, requiring two locks, both having a double chamber, in a line ninety feet in length each, and twenty-four feet wide, for the purpose of accommodating the descending river trade. The lower dam in the vicinity of Queen's run, is seven hundred and thirty feet long, and seven and one half feet high, above the comb of the Dunnstown dam. It is finished, and the lock adjoining it is also nearly completed. The foundation of the upper lock is laid and some progress made in several sections of towing path and other work. The upper dam at Lick run, which is to be nine feet high and six hundred and fifty feet long, has not been put under contract. The whole work on the extension is estimated to cost one hundred and ninety-two thousand seventeen dollars and eight cents, of which, the work under contract will cost seventy-nine thousand eight hundred and one dollars and sixty-eight cents, and the work to be put under contract

one hundred and twelve thousand two hundred and fifteen dollars and forty cents. The whole can be completed next summer.

In adopting a form of contract for the construction of work at the commencement of the Pennsylvania improvements, the Canal Commissioners introduced a clause for the security of the Commonwealth, providing, That twenty per cent. should be retained out of the estimates, until the jobs were completed. But, during the progress of the work, it was decided by the officers of the accounting department, that the Board had no power to pay the retained per centage, or any part of it, when the work was abandoned by a contractor, or declared forfeited by the agents of the Commonwealth. Hence in 1831, this provision in the new contracts was modified so as to retain but fifteen per cent. to be forfeited to the Commonwealth, unless the Canal Commissioners should otherwise direct. These forfeitures upon the several lines, amount to the aggregate sum of forty-four thousand eight hundred and eighty-four dollars and eighty-three cents; a portion of which, the Board believe ought to be paid; but for want of power over the first class of cases, and a want of funds to pay any of them, they are unable to grant relief. The Board asked the Legislature at their last session for an appropriation of twenty-five thousand dollars for that purpose, believing that that sum would be sufficient to pay all just claims, but it was not granted. They now renew the application for the same sum of twenty-five thousand dollars, and for authority to pay so much of the retained per centage as may appear to be justly and equitably due to the contractors.

Statement of the disbursements for construction in the year ending 31st October, 1835.

COLUMBIA RAILWAY.

Amount of former appropriations not settled at the Treasury, November 1, 1834,		$146,786 78
Balance of appropriation set apart for the Lancaster line,		11,829 12
Appropriation of the 13th April, 1835,		110,600 00
		$269,215 90
Amount settled in the year ending 31st October, 1835, by Wm. B. Mitchell, Superintendent,	$179,103 04	
By J. Mosher, do.	58,956 12	
		238,059 16
Balance not settled at the Treasury on the 1st November, 1835,		$31,156 74

Sum required to complete the railway,		43,708 72
From which deduct the above balance,		31,156 74
Balance to be provided,		$12,551 98

PORTAGE RAILWAY.

Amount of former appropriations not settled at the Treasury, November 1, 1834,		156,603 98
Appropriation of the 13th April, 1835,		146,600 00
		$303,203 98
Amount settled in the year ending October 31, 1835, by Samuel Jones, Superintendent,	273,763 76	
By Wilson Knott, Superintendent,	27,443 82	
		301,207 58
Balance not settled at the Treasury on the 1st November, 1835,		$1,996 40
Sum required to complete the railway,		44,457 80
Deduct the above balance,		1,996 40
Balance to be provided,		$42,461 40

WYOMING LINE.

Amount of former appropriations not settled at the Treasury, November 1, 1834,		241 10
Appropriation of the 13th April, 1835,		40,500 00
		$40,741 10
Amount settled in the year ending October 31, 1835, by Lord Butler, Superintendent,	234 06	
By G. Crawford, Superintendent,	38,435 41	
		38,669 47
Balance not settled at the Treasury, November 1, 1835,		$2,071 63

LYCOMING LINE.

Amount of former appropriations not settled at the Treasury, November 1, 1834,		33,587 89
Appropriation of the 13th April, 1835,		47,000 00
		$80,587 89

Amount settled in the year ending 31st October, 1835, by William F. Packer, Superintendent,	69,779 48	
By G. Crawford, do.	1,608 78	
		71,388 26
Balance not settled at the Treasury on the 1st November, 1835,		$9,199 63

TANGASCOOTACK

Extension of the West Branch Division.

Appropriation of the 13th April, 1835,	80,000 00
Sum paid to contractors up to 31st October, 1835,	52,854 60
Balance,	$27,145 40
Sum required to complete the extension,	139,162 48
Deduct the above balance,	27,145 40
Appropriation required to complete the work,	112,017 08

A statement of the sums drawn from the Treasury in the year ending on the 31st October, 1835, out of the fund appropriated for new work upon finished lines.

Pay of the Canal Commissioners, their Secretary and office expenses,	6,000 00
Appraisers of damages,	3,786 00
Western division,	20,463 22
Eastern division, including Swatara feeder,	35 609 24
North Branch division,	500 00
West Branch division,	11,502 15
Susquehanna division,	381 00
Juniata division,	1,474 85
	$79,716 46

The details of the above expenditures upon the divisions, appear in the reports and tables of the several Superintendents, accompanying this report.

STATEMENT

Of the Sums drawn from the Treasury, for the Repair of the Canal and Railways, in the year ending 31st October, 1835.

Columbia railway,	82 miles,	41,973 13
Eastern division and lower thirteen miles of the Juniata division,	58 "	19,854 13
Juniata division, upper part,	119 "	40,605 56
Portage railway,	36¾ "	41,406 53
Western division,	106½ "	58,761 42
Beaver division,	80 "	4,683 37
Frenchcreek division,	46 "	20,490 97
Susquehanna division,	39 "	9 000 00
West Branch division,	72 "	35,819 79
North Branch division,	73 "	21,534 45
Delaware division,	59¾ "	29,250 00
		$323,379 35

STATEMENT

Of the Sums drawn from the Treasury, for the Payment of Damages upon the Canal and Railways, in the year ending 31st October, 1835.

Columbia rail-way,	$25,735 00
Eastern division,	914 20
Juniata division,	4,880 00
Western division and Portage rail-way,	11,030 00
Beaver division,	10,025 00
French Creek division,	15,330 24
North Branch division,	1,875 00
West Branch division,	9,000 00
Susquehanna division,	1,500 00
	$80,289 44

STATEMENT

Of the Appropriations required for the Current Year.

To complete the Columbia rail-way,	$12,551 98
To complete the Portage rail-way,	42,461 40
To complete the Tangascootack extension,	112,017 08
The estimated cost of the reservoirs on the Eastern and Western sides of the mountain, is $166,980 00, of which there will be required within the present year	60,000 00
For twenty locomotive engines and for ropes upon the Columbia rail-way,	136,743 59
For four additional locomotive engines, and for ropes, repairing machinery and debts due for motive power upon the Portage railway,	61,117 48
For new work, and for paying debts due upon finished lines, and for pay of Canal Commissioners, appraisers, superintendants and engineers,	30,000 00
There will be required for the repairs of the canal and rail-ways,	300,000 00
To pay damages,	20,000 00
To pay the award of the arbitrators appointed under the act of the 11th of March 1835, to assess the damages sustained by the owners of the land through which the Grant's Hill tunnel passes, and costs,	9,889 37½
To pay retained per centage,	25,000 00
	$809,780 84½

The annexed tables contain statements shewing the amount of property and the kinds thereof conveyed on the Pennsylvania canal and railways during the past year, as required by law. Also the amount of toll collected at each collector's office, and paid into the Treasury.

Table No. 1. exhibits an abstract statement of property shipped upon the improvements in the year.

Table No. 2. shews the property taken off at Philadelphia, Bristol and Portsmouth. The aggregate taken off at these offices shews the amount shipped for Philadelphia, upon the public im-

provements—as that taken off at Portsmouth, principally arrives at Philadelphia by way of the Union and Schuylkill canals, and that taken off at Bristol reaches the city by the river Delaware.

Tables No. 3. and 4. Shew the property shipped at the several offices westward and northward, and eastward and southward. The first three columns in table No. 3. shew the amount of property shipped from Philadelphia, which passed upon the improvements—as the office at Bristol is reached from Philadelphia, by the river Delaware, and Portsmouth by the Schuylkill and Union canals.

Before closing this report, the Board would respectfully call the attention of the Legislature, to the policy of further extensions of the public improvements, with a view to accommodate the growing interests of the Commonwealth. The works that the Board consider of primary importance, and which ought to be constructed as soon as practicable—are, an extension of the North Branch division to the New York line, and a connection of the present improvements with Lake Erie, on account of their intrinsic value as avenues of trade, and because these lines constitute a part of the improvements, originally designated as the Pennsylvania system.

The following lines and extensions of the canal, comprise those which should be constructed by the state.

A canal and slack-water from the mouth of the Lackawana creek, up the North branch of the Susquehanna to the North line of the State. From that point a connection can be formed with the Chemung canal at Elmira, with the Ithaca rail-road at Owego, and with the great Erie rail-road of New York, near Athens. This would open an immense market for the anthracite coal of the Wyoming valley, and complete the last link in a great main line of canal across the State, from north to south.

A canal from Pittsburg down the Ohio river, to connect with the Beaver division at the mouth of Big Beaver, and thence to the mouth of Little Beaver, to connect with the Beaver and Sandy canal now in a course of construction.

A canal and slack-water, or a navigation suitable for steam boats on the Allegheny river from the Kiskaminitas aqueduct, to connect with the French creek division at Franklin.

A canal from one end of the French creek feeder to the borough of Erie.

A canal from Conneaut lake to the head of the Beaver division, six miles above New Castle.

A slack-water navigation on the Monongahela river, with locks capable of passing steam boats from Pittsburg to the Virginia line.

A canal from the North Branch division up the Nescopeck, to connect with the improvements of the Lehigh navigation company.

A canal and slackwater from the head of the West Branch division to the Allegheny river. If, however, the want of a sufficient quantity of water at the summit of the dividing ridge should render a continuous canal impracticable, a Portage rail way can be

substituted. This great work would complete a main line diagonally through the State between the lakes and the sea-board.

And lastly, a canal from the present termination of the Delaware division at Bristol, to connect with the Delaware and Schuylkill rivers at Philadelphia.

In thus drawing public attention to the lines of improvement which are obviously necessary to be constructed at the earliest practicable period, the Board have not adverted to the many valuable works now in a course of construction by incorporated companies, all of which when completed, will accommodate the public, while most of them will contribute to increase the trade on the public works, and swell the tolls flowing into the treasury.

Signed by order of the Board:

JAMES CLARKE, *President.*

Attest,

FRANCIS R. SHUNK, *Secretary.*

TABLE No. I.

Property shipped upon the Pennsylvania Improvements in the year ending 31st October, 1835.

ARTICLES.		Shipped North and West.
Fish,	Barrels.	29,785
Butter and Cheese	Pounds.	152,296
Salt,	Bushels.	456,200
Wool,	Pounds.	125,376
Cotton,	do.	294,979
Hemp,	do.	435,117
Tobacco,	do.	857,182
Leather,	do.	302,813
Raw Hides,	do.	1,742,251
Furs and Peltry,	do.	15,041
Whiskey and Domestic Spirits,	Gallons.	115,144
Merchandize,	Pounds.	36,859,711
Groceries,	do.	23,335,993
Oil,	Gallons.	107,381
Drugs and Dye-stuffs,	Pounds.	1,605,203
Gypsum,	Tons.	12,489
Furniture,	Pounds.	1,837,785
Window Glass,	Boxes.	8,572
Mineral Coal,	Tons.	3,043
Iron Ore,	do.	4,953
do. Pigs and Castings,	Pounds.	2,595,557
do. Blooms, Bar and Sheet,	do.	29,024,685
Copper and Tin,	do.	505,452
Marble,	do.	557,382
Lime,	Bushels.	5,339
Limestone,	Perches.	1,549
Bricks,	Number.	450,957
Timber,	Feet.	29,817
Sawed Lumber,	do.	587,965
Staves, Heading, and Hoop Poles,	Pounds.	466,946
Shingles,	Number.	341,096
Posts and Rails,	do.	7,856
Sundries,	Pounds.	11,667,007
Boats and Cars cleared,	Number.	41,425
Passengers,	Miles travel'd.	5,920,167

TABLE No. I.—CONTINUED.

Property shipped upon the Pennsylvania Improvements in the year ending 31st October, 1835.

ARTICLES.		Shipped South and East.
Flour,	Barrels.	263,662
Wheat,	Bushels.	243,539
Corn and other Grain,	do.	393,315
Clover and other grass seeds,	do.	25,609
Potatoes,	do.	19,489
Bacon,	Pounds.	5,267,999
Butter and Cheese,	do.	740.125
Lard and Tallow,	do.	497,976
Salt,	Bushels.	53,767
Feathers,	Pounds.	111,236
Wool,	do.	1,131,118
Cotton,	do.	19,038
Hemp,	do.	4,530
Tobacco,	do.	5,858,360
Leather,	do.	1,361,905
Furs and Peltry,	do.	277,270
Whiskey and Domestic Spirits,	Gallons.	1,126,240
Oil,	do.	45,743
Furniture,	Pounds.	937,617
Window Glass,	Boxes.	6,240
Mineral Coal,	Tons.	118,952
Iron Ore,	do.	1,523
do. Pigs and Castings,	Pounds.	15,055,644
do. Blooms, Bar and Sheet,	do.	7,121,824
Marble,	do.	3,654,527
Lime,	Bushels.	114,631
Limestone,	Perches.	,607
Slate for Roofing,	Pounds.	748,965
Bricks,	Number.	898,884
Timber,	Feet.	128,650
Sawed Lumber,	do.	13,940,592
Staves, Heading, and Hoop Poles,	Pounds.	3,872,221
Shingles,	Number.	4,461,078
Posts and Rails,	do.	27,169
Sundries,	Pounds.	60,332,768
Boats and Cars cleared,	Number.	36,285
Passengers,	Miles travel'd.	5,311,757

TABLE No. 2.

Property taken off the Pennsylvania Improvements at Philadelphia, Bristol and Portsmouth, in the year ending 31st October, 1835: Also, the amount taken off at, and shipped East from Pittsburg.

ARTICLES.		Taken off at PHILADELPHIA.	Taken off at BRISTOL.	Taken off at PORTSMOUTH.	Taken off at PITTSBURG.	Shipped East from PITTSBURG.
Flour,	Barrels.	78,91	91,361	65,883	7	37.
Wheat,	Bushels.	2,1		492,686		
Corn and other Grain,	do.	58,8	60,534	142,283	1,096	4,
Clover and other grass seeds,	do.	1,9	245	2,461		
Potatoes,	do.	9	1,811	2,156		2,
Salted Beef,	Barrels.			86		1,
do. Pork,	do.	1	11	441		
Bacon,	Pounds.	6		2,316,991		5,249,
Fish,	Barrels.	5	3	21		
Butter and Cheese,	Pounds.	99,5	45,707	232,678	9,774	
Lard and Tallow,	do.	240,6	11,227	106,138	3,860	30,
Salt,	Bushels.				2,800	408,
Provisions not specified,	Pounds.	386,3	2,000		215,352	
Feathers,	do.	39.		83,526	4,517	43,
Wool,	do.	304.	6,042	730,039		110.
Cotton,	do.	7,	66,000	15,846	66,229	988,
Hemp,	do.		225,370	8,651		16,
Tobacco,	do.	2,823,	14,100	3,015,095	197,200	4,4
Leather,	do.	495.	147,942	704,688	74,378	5,840,0
Raw Hides,	do.	3.	2,500	82,167	145,829	49,9
Furs and Peltry,	do.	193		41,861	61,686	20.
Whiskey & Domestic Spirits,	Gallons.	390	278,510	328,723		277,0
Merchandize,	Pounds.	467		177,108		45,9
Groceries,	do.			525	30,280,596	660,1
Oil,	Gallons.	2	26,341	30,872	4,877,686	696,9
Drugs and Dye-stuffs,	Pounds.	51		7,696	50,363	9,5
Gypsum,	Tons.				313,493	3,6
Furniture,	Pounds.	241	112,027	123,931	13	
Window Glass,	Boxes.	2	188	5,018	845,353	258,2
Rags,	Pounds.	138	61,135	377,218	838	5,9
Mineral Coal,	Tons.		70,581	6,142	7,149	211,1
Iron Ore,	do.		1,454	6,594		8
do. Pigs and Castings,	Pounds.	979	909,678	6,453,567	12	
do. Blooms, Bar and Sheet,	do.	2,558	385,733	3,219,892	1,079,132	1,070,7
Lead in Pigs and Bars,	do.	2			22,428,098	2,997,47
Copper and Tin,	do.	13	19,240	590	5,360	11,93
Marble,	do.	3,134			312,874	18,98
Lime,	Bushels.	17	20,977		72,870	
Limestone,	Perches.		2,780	718		
Slate for Roofing,	Pounds.		808,704			
Bricks,	Number.			541,159		197,25
Timber,	Feet.	74	5,727	3,050	2,220	2,44
Sawed Lumber,	do	1,43	1,305,228	4,984,262	1,000	212,98
Staves, Heading, & Hoop Poles,	Pounds.	384	37,500	1,691,606	13,200	347,06
Shingles,	Number.	809	160,700	618,900		283,75
Posts and Rails,	do.	1		6,511		3,14
Sundries,	Pounds.	915	29,181,866	6,729,436	2,031,884	1,112,66

TABLE No. 3.

Proper[illegible]hipped Westward and North[illegible]s

[illegible]ward upon the Pennsylvania Improvements, in the year ending 31st Oct

[illegible]hipped Westward upon the Portage Railway from Hollidaysbug.

ARTICLES.		Office at PHILADELPHIA.	Office at PORTSMOUTH.	Office at BRISTOL.	Other OFFICES WEST.	Other OFFICES NOR
Flour,	Barrels.				617	268
Wheat,	Bushels	39	15		1,133	109
Corn and[illegible]er Grain,	do.	13			21,272	963
Clover a[illegible]ther grass seeds,	do.	64		23	384	3
Potatoes,	Barrels.	35		419	1,537	293
Salted B[illegible]	do.	720	579	103		
do P[illegible]	Pounds.	35	214			33
Bacon,	Barrels.	19,405	34,942		9,597	1,007
Fish,	Pounds.	3,085	20,075	5,697	747	181
Butter and[illegible]heese,	do.	86,627	51,749		13,920	
Lard and[illegible]llow,	Bushels.	2,221	3,500	6,673	3,575	20
Salt,	Pounds.	25,407	50,145	34,009	286,136	3,195
Provisions[illegible]t specified,	do.	9,825		17,683	2,100	
Feathers,	do.	4,987	2,460			
Wool,	do.	76,187	34,359		14,820	2,906
Cotton,	do.	195,706	1,046	95,321		
Hemp,	do.	1,100	306,303	127,714		8,564
Tobacco,	do.	125,066	526,346	184,429	12,777	6,801
Leather,	do.	92,169	177,692	4,306	21,845	12,285
Raw Hid[illegible]	do.	373,122	1,077,611	271,590	8,135	
Furs and[illegible]try,	do.	15,041		28,773	76,740	686
Whiskey[illegible] Domestic Spirits,	Gallons.	8,945		967,988	594,595	250,364
Merchan[illegible],	Pounds.	12,041,889	23,004,875	3,536,756	4,314	771,655
Grocerie[illegible]	do.	5,538,399	13,464,869	13,885	1,479	833
Oil,	Gallons.	26,219	64,974			
Drugs and[illegible]ye-stuffs,	Pounds.	360,904	1,244,299	2,900	646	124
Gypsum,	Tons.	1,055	7,764	65,570	551,829	99,765
Furnitur[illegible]	Pounds.	578,564	542,057	1,737	304	1 643
Windowass,	Boxes.	1,657	3,231	200	5,674	12,360
Rags,	Pounds.	498,261		418	691	88
Mineral[illegible]l,	Tons.	1,673	173		3,777	589
Iron Ore[illegible]	do.		587	84,370	1,536,620	216,474
do Pig[illegible] Castings,	Pounds.	312,306	445,787	683,493	25,337,446	317,501
do Blo[illegible] Bar and Sheet,	do.	666,118	2,015,097	6,009		691
Lead in[illegible] and Bars,	do.	15,575	18,017	19,098	7,681	2,225
Copper[illegible] Tin,	do.	128,788	347,660	116,575	34,744	14,124
Marble,	do.	130,413	261,526	836	698	3,755
Lime,	Bushels.				547	985
Limeston[illegible]	Perches.		17			
Slate for[illegible]ofling,	Pounds.	1,530			246,106	90,823
Bricks,	Number.	91,328	10,200	12,500	20,739	7,471
Timber,	Feet.		1,697		316,900	115,039
Sawed[illegible]lber,	do.	68,389	45,430	43,183	356,035	
Staves, [illegible]kling, & Hoop Poles,	Pounds.	34,726		76,185	68,400	13,000
Shingles[illegible]	Number.	4,870	13,000	241,826	3,156	
Posts and[illegible]Rails,	do.	500	3,000	1,200	784,612	849,503
Sundrie[illegible]	Pounds.	2,477,969	2,195,756	460,210	6,239	4,139
Boats a[illegible]Cars cleared,	Number.	14,172	2,691	2,227		

Property shipped Eastward and South

ARTICLES.		PITTSBURG, Eastward.	HUNTINGDON, Eastward.	LEWISTOWN, Eastward.	NEWPORT, Eastward.	HARRISBU Eastward.
Flour,	Barrels.	37,515	3,636	12,291	21,299	6,904
Wheat,	Bushels.	212	10,530	72,596	23,299	2,297
Corn and other Grain,	do.	4,995	2,591	29,399	25,762	12,606
Clover and other grass seeds,	do.	341	945	3,757	2,583	989
Potatoes,	do.	2,716	41	178	86	690
Salted Beef,	Barrels.	1,347				
do. Pork,	do.	345		91	21	5
Bacon,	Pounds.	5,249,689	5,969			1,145
Fish,	Barrels.	352	2			14
Butter and Cheese,	Pounds.	30,452	8,446	11,009	41,857	36,059
Lard and Tallow,	do.	408,576			605	450
Salt,	Bushels.		588		1,930	71
Provisions not specified,	Pounds.	46,182				11,270
Feathers,	do.	110,703				
Wool,	do.	988,205	1,412	659		888
Cotton,	do.	16,626				
Hemp,	do.	4,446				
Tobacco,	do.	5,840,011				
Leather,	do.	49,962	29,381	27,029	239,448	275,096
Raw Hides,	do.	20,862		600		2,391
Furs and Peltry,	do.	277,070				
Whiskey and Domestic Spirits,	Gallons.	45,937	1,975	26,886	22,598	42,040
Merchandize,	Pounds.	660,141	18,244	3,815		31,605
Groceries,	do.	696,917			515	1,725
Oil,	Gallons.	9,526	96			359
Drugs and Dye-stuffs,	Pounds.	3,668				
Gypsum,	Tons.					
Furniture,	Pounds.	258,202	27,738	21,573	50,520	43,956
Window Glass,	Boxes.	5,905	104			99
Rags,	Pounds.	211,194	17,285	22,427	28,278	50,209
Mineral Coal,	Tons.	836	107		22	6,836
Iron Ore,	do.				16	
do. Pigs and Castings,	Pounds.	1,070,783	694,244	2,272,074	2,186,692	1,531,341
do. Blooms, Bar and Sheet,	do.	997,478	58,626	1,121,037	7,247	1,427,300
Lead in Pigs and Bars,	do.	11,934				
Copper and Tin,	do.	18,986				
Marble,	do.					350
Lime,	Bushels.					
Limestone,	Perches.					125
Slate for Roofing,	Pounds.					
Bricks,	Number.	197,250	17,000		14,000	547,459
Timber,	Feet.	2,440	3,000		80	27,225
Sawed Lumber,	do.	212,987	45,408	700	1,200	1,256,992
Staves, Heading, and Hoop Poles,	Pounds.	347,066	61,655	368,442	144,931	285,961
Shingles,	Number.	283,750	68,175		16,800	107,000
Posts and Rails,	do.	3,140		5,079	3,882	8,933
Sundries,	Pounds.	1,112,667	114,566	202,648	65,265	3,468,453
Boats and Cars cleared,	Number.	1,988	587	481	486	1,101

TABLE No. 1.

at the several Collector's offices upon the Pennsylvania Improvements, in the year ending October 31st, 1835.

COLUMBIA, Eastward.	LANCASTER, Eastward.	DOWNINGTOWN, Eastward.	PAOLI, Eastward.	BERWICK, Southward.	DUNNSTOWN, Southward.	NORTHUMBERLAND, Southward.	LIVERPOOL, Southward.
7,847	22,243	34,523	3,018	1,150	745	6,909	1,878
	204	1,154	2,179	67	2,432	112,461	13,988
767	5,397	21,740	40,101	7,345	1,125	44,052	28,768
164	212	375	33	390	379	5,366	9,016
18		396	601	1,707	86		309
							5
	7	4,300	2,840		500	1,130	
	27,254				18		
18,091	28,344	35,656		16,597		79,212	78,982
5,129		18,006	16,315			2,999	
	256,317			201		3,720	87
		15,110	35,616			832	465
	822						
300	162						315
			105				
	3,391						87
	78,569						
207,647	2,070	64,321		10,473	4,900	92,465	49,449
			45,339		1,326		
	270,259						200
40,315	3,065	127,795		6,907	2,082	164,474	27,260
1,760	1,000	283,392	8,960	15,342	5,700	400	
	130		33,895	11,686			1,200
40	481		30	288		1,550	
							230
	72,604					53	
19,621	31	24,149	58,351	83,147	13,639	89,019	18,784
	11,594					38	
22,798		8,234	10,528	4,867		56,782	27,538
3,420			13	10,634	74	49	360
	748,928						
491,750	224,984	413,240	82,239	2,438	2,809,640	315,902	
302,018	2,000	1,604,165	104,314	47,960	756,371	284,664	43,360
	22,793						
	16,527		100	379		1,475	
			3,147,986				700
		633	17,258	180	300		
		447					
		13,440					
		14,000	4,740	96,150		4 000	
5,404		4,000		534		11,206	2,294
1,458,404		15,500	63,751	128,825	56,000	439,332	247,406
340,322				1,200	32,500	205,204	262,831
1,064,718			,250	18,400	6,000	308,400	32,895
1,943			21 300	930	3,870	300	420
193,263	106,375	359,827	516,157	1,557,432	193,329	490,954	1,026,911
11,592	5,974	2,440	2,401	521	224	1,483	231

TABLE No. 4.

Property shipped Eastward and Southward at the several Collector's offices upon the Pennsylvania

HUNTINGDON, Eastward.	LEWISTOWN, Eastward.	NEWPORT, Eastward.	HARRISBURG, Eastward.	COLUMBIA, Eastward.	LANCASTER, Eastward.	DOWNINGTOWN, Eastward.	PAOLI, Eastward.
3,636	12,291	21,299	6,904	7,847	22,243	34,523	3,018
10,330	72,596	23,299	2,297		204	1,154	2,179
2,591	29,399	25,762	12,606	767	5,397	21,740	40,101
945	3,757	2,583	989	164	212	375	33
41	178	86	690	18		396	601
	91	21	5				
5,909			1,145		7	4,300	2,840
2			14		27,254		
8,446	11,009	41,857	36,059	18,091	28,344	35,656	
		605	450	5,129		18,006	16,315
568		1,930	71		256,317		
			11,270			15,110	83,616
1,412	659		888	300	822 162		105
					3,391		
29,381	27,029	239,448	275,096	207,647	78,569 2,070	64,321	
	609		2,391				45,339
					270,259		
1,975	26,886	22,598	42,040	40,315	3,065	127,795	
18,244	3,815		31,605	1,760	1,000	283,392	8,960
		515	1,725		130		33,895
96			352	40	481		30
					72,604		
27,738	21,573	50,520	43,956	19,621	31	24,149	58,351
104			92		11,594		
17,285	22,427	28,278	50,209	22,798		8,234	10,528
107		22	6,836	3,420			13
		16			748,928		
694,244	2,272,074	2,186,692	1,531,341	491,750	224,984	413,240	82,239
58,626	1,121,037	7,247	1,427,300	302,013	2,000	1,604,165	104,314
					22,793		
					16,527		100
			350				3,147,986
						633	17,258
			125			447	
17,000						13,440	
3,600		14,700	547,459			14,000	4,740
45,408		80	27,225	5,404		4,000	
61,655	700	1,200	1,256,992	7,458,404		15,500	63,751
68,175	368,442	144,931	285,961	340,322			
		16,800	107,000	3,064,718			250
	5,079	3,882	8,933	1,943			21,300
114,566	202,648	65,265	3,468,453	193,263	106,375	359,827	516,157
587	481	486	1,101	11,592	5,974	2,440	2,401

year ending October 31st, 1835.

NORTHUMBERLAND, Southward.	LIVERPOOL, Southward.	EASTON, Southward.	NEW H[illegible]E, Southward.	INTERMEDIATE Offices, Eastward.	INTERMEDIATE Offices, Southward.	AGGREGATE, Eastward and Southward.
6,909	1,878	82,234	17,08[illegible]	4,329	56	263,662
112,461	13,988		48[illegible]	1 640		243,539
44,052	28,768	63,299	5,15[illegible]	94,668	5,543	393,315
5,366	9,016	704	[illegible]	347		25,609
	309	1,716	[illegible]	1,216	9,639	19,489
	5			35		40
			1[illegible]	80		666
1,130			80[illegible]	1,736		5,267,999
			2[illegible]	6	3	427
79,212	78,982	40,295	31[illegible]	8,069	307,834	740,125
2,999		6,494	10,95[illegible]		108	497,976
3,720	87		9[illegible]	45,760	1,318	53,767
832	465			6,606		419,398
					533	111,236
	315	7,480	2,70[illegible]	99,222	29,009	1,131,118
					2,250	19,038
	87					4,530
		14,958				5,858,300
92,465	49,449	180,222	2,91[illegible]	5,542		1,361,905
					768	28,017
	200					277,270
164,474	27,260	310,331	5,120	8.971	14,324	1,126,240
400			1,000	116,568	171	1,175,158
	1,200		1,400	17,539		731,992
1,550		27,022	6,280		429	45,743
	230					4,379
53				361	92	503
89,019	18,784	93,964	10,535	41,115	5,700	937,617
38		71				6,244
56,782	27,538	65,759	15,613	4,000	18,587	575,693
49	360	86,406		10,172	23	118,952
		1,507				1,523
315,902		1,227,931	2,474	940,523	265,495	15,055,644
284,664	43,360	126,748		222,232	1,300	7,121,824
						13,934
1,475		11,290				55,023
	700			488,964		3,654,527
			96,260			114,631
		1,592	3,247	162	34	5,607
		735,504		21		748,965
4 000			1,600	2,085		893,884
11,206	2,294		49.349	700	21,818	128,650
439.332	247,406	1,527,318	256,812	916,464	713,493	13,940,592
205,204	262.831	37,500		1,008,209	776,400	3,872.221
308,400	32,895	338,500		164,680	30.600	4,461,078
300	420			8,252	120	27,169
490,954	1,026,911	13,135,446	14,579,699	16,833,075	1,552,900	55,558,967
1,483	231	2,239	536	3,190	812	36,285

TABLE No. 5.

A Statement shewing the amount of tolls collected at each Collector's office upon the Pennsylvania Canal and Railways, and paid into the Treasury in the year ending on the 31st October, 1835. Also, the amount collected and paid in for Motive Power on the Railways.

OFFICES.	Canal Tolls.	Railway Tolls.	Motive Power.
Philadelphia,		69,351 70	19,501 97
Paoli,		3,929 82	455 74
Downingtown,		8,311 65	2,515 04
Lancaster,		9,489 78	3,272 34
Columbia,	18,506 59	47,737 95	18,045 46
Portsmouth,	35,222 84		
Harrisburg,	35,008 92		
Newport,	3,547 59		
Lewistown,	10,356 40		
Huntingdon,	3,634 25		
Hollidaysburg,	52,328 44	27,598 31	28,354 23
Johnstown,	60,878 61	27,205 68	19,581 32
Blairsville,	900 00		
Leechburg,	3,433 07		
Pittsburg,	36,274 26		
Beaver,	2,220 53		
Franklin,	883 75		
Liverpool,	1,841 25		
Northumberland,	19,241 60		
Dunnstown,	2,955 65		
Berwick,	3,321 22		
Easton,	39,289 02		
Newhope,	4,834 59		
Bristol,	12,097 76		
Columbia out-let Locks,	112 37		
Portsmouth out-let Locks,	251 86		
do. Bridge, Swatara,	485 17		
Bridge, Duncan's Island,	3,267 01		
Schuylkill Viaduct,		998 40	
Aqueduct, Duncan's Island,	58 71		
do. Jack's Narrows,	153 00		
do. Kiskiminitas,	178 47		
do. Pittsburg,	1,725 50		
	403,008 43	194,623 24	86,726 10

LIST OF DOCUMENTS

ACCOMPANYING THE REPORT OF THE

CANAL COMMISSIONERS.

COLUMBIA RAILWAY.

No. 1. Report of Joseph Mosher, superintendent, accompanied with statements A, B, C, D, and E.
2. Report of E. F. Gay, principal engineer.
3. Report of E. F. Gay, engineer, upon motive power.
4. Report of J. Mosher, superintendent, upon motive power.
5. Report of do upon cost of locomotives, accompained with statements A. cost of repairs, fuel, &c. B. names of agents and there pay.
6. Abstract of report on motive power.
7. Abstract of receipts and expenditures.
8. Report of John S. Cash, supervisor, of motive power.

EASTERN DIVISION.

9. Report of John C. M'Allister, late superintendent, accompanied with detailed statements.
10. Report of Edward F. Gay, engineer.

JUNIATA AND WESTERN DIVISION.

11. Report of J. K. Moorhead, late superintendent, Juniata division.
12. Report of S. Jones, late superintendent, Western division.
13. Report of S. Welch, engineer, upon a reservoir for the Western division.
14. Report of S. Welch, engineer, upon the Juniata and Western division.

PORTAGE RAILWAY.

No. 15. Report of S. Jones, late superintendent.
16. Report of Wilson Knott, superintendent, accompanied with tables of expenditures marked A.
17. Report of S. Welch, principal engineer.
18. Report of S. Welch, principal engineer, upon motive power.
19. Report of Wilson Knott, supervisor, on motive power.

BEAVER DIVISION.

20. Report of Samuel Power, late superintendent, accompanied with statements A. and B.

WEST BRANCH AND NORTH BRANCH DIVISION.

No. 21. Report of G. Crawford, superintendent.
22. Tables of expenditures by G. Crawford.
23. Report of R. Faries, engineer, upon the North and West Branch division.
24. Report of R Faries, engineer, upon the Tangascootack extension.

DELAWARE DIVISION.

25. Report of Simpson Torbert, late superintendent.

FRENCH CREEK AND BEAVER DIVISION.

26. Report of Sylvester Welch, engineer.
27. Journal of the board of Canal Commissioners.

PHILADELPHIA AND COLUMBIA RAILWAY.

NO. 1.

Report of Joseph Mosher, Superintendent.

JAMES CLARKE, ESQUIRE,
President of the Board of Canal Commissioners.

I herewith transmit statements of the amount expended by me on the Columbia and Philadelphia railway. Statement A, exhibits the names of the contractors, kind of work done, amount estimated, per centage due, and the amount paid, as also the amount paid for rail way iron, articles furnished for work shops, staniary, and locomotive and stationary engines, &c. Statement B, gives the names of all the persons employed on the line during the year, their grade, time of service, salary, and the amount paid each. It also gives the names of the persons at present employed on this line. Statement C, exhibits the sums paid for hauling of iron, for castings, ropes, fuel, oil, services, tools, machinary for workshops, smithing, &c. for the maintenance of motive, prior to the 2d February, when the law for its maintenance went into operation, as also a statement of incidental expenses. Statement D, exhibits the damage claims paid, shewing those paid on offers made by the board, and those paid on awards of the board of appraisers, the amount, and to whom paid. Table E, gives the number of locomotives now on the road, their names, the cost of each, and the name of builder or person from whom purchased.

In the estimated amount required for the year, there was not included two small cargoes of iron that had been previously ordered, nor was it thought necessary to add any sum in the estimate for the payment of the debts due for the maintenance of the motive power, prior to the 2d February, but on settlement of the accounts it was found necessary to apply a part of the appropriation for construction to the payment of those debts, thus causing a deficiency in that fund to the amount shown on the tables.

In Mr. Gay's last report, he estimates dwellings for workmen at the Parkesburg depot; but in consequence of a part of the appropriation having been applied to the purposes already mentioned, it was deemed prudent not to put them under contract.

I would suggest the propriety of an early appropriation by the legislature for the purchase of twenty additional locomotives, as it is a well known fact, that there is still a great want of power on the road.

The relative qualities of the American and English engines have been fairly tested, and the American ones are decidedly preferable, as they draw greater burdens, require less repair, and cost less money; and by making an early contract with our mechanics, we might

be prepared for the spring business, which will most assuredly require all the additional power I have recommended.

The law of the 27th February last, authorizing a double track of rails to be laid on the Columbia bridge, has been complied with; the job was let to Messrs. Witton, White, and Boyd for three thousand six hundred and ninty nine dollars; the work has been done, and the improvement in use for some time, as well as the extension of the roads from the west end of the bridge, authorized by the same law.

The resolution of the legislature approved the 26th March last, has been carried into effect, and the sum of sixteen thousand eight hundred fifty seven dollars ninety one cents, paid to John Mathiot, Esq. mayor of the city of Lancaster, who had been authorized by the councils of said city to receive and to receipt for the same.

The present price of locomotive engines, is six thousand four hundred dollars, and in consequence of the advance in price there is a deficiency in that fund of five thousand four hundred forty three dollars fifty nine cents, which will be required to enable the superintendant to pay for those already contracted for, and should the board agree with me in the number necessary, it will require an additional appropriation for that purpose of one hundred and twenty eight thousand dollars.

In order to complete the line, and stock it with engines, I would submit the following, as embracing all the appropriations necessary, viz:

Collectors' office and dwellings for workmen at Parkesburg,		$6,000 00
Embankment at west end of Schuylkill viaduct to protect wing walls,		750 00
Fencing at Columbia and Schuylkill planes,		350 00
Contingent expenses of the year,		5,000 00
Deficiency on table A,	11,023 88	
Do do B,	1,129 66	
There is also various sums due for hauling iron, laying water pipes, lumber, brick, workmanship, &c.	2,427 73	
	14,581 27	
From which deduct cash on hand,	4,416 48	
		10,164 79
Appropriation wanted for road,		22,264 79
Add deficiency for locomotives,	5,443 59	
For 20 additional do	128,000 00	
		133,443 59
Amount required		$155,708 38

It has been lately suggested to me that a patent had been obtained for an improvement by which the weight of the tender can be thrown on the engine at pleasure: for this patent it is said three hundred dollars per engine will be claimed; the plan was adopted and applied to eighteen engines now in use on the road, or under contract. As yet

we have no certain knowledge that such a claim will be presented ; if, however, such should be the case and substantiated, it will require an additional sum of five thousand four hundred dollars to pay this extraordinary claim.

Accompanying this report is an abstract of the amount drawn for construction, for the payment of damages, for the purchase of locomotives, and the amount expended and balance due.

Respectfully submitted,

JOSEPH MOSHER,
Superintendent of the Columbia Railway.

November 3d, 1835.

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ABSTRACT.

Amount drawn from the treasury for construction of railway, of the appropriation of $110,600 made 13th April, 1835,	$69,100 05	
Amount expended, as per statement A, B, and C, for construction of railway from 11th May 1835, to November 1,	64,683 57	
Balance due commonwealth,		$4,416 48
Amount drawn from the treasury, per resolution of the legislature, dated 26th March 1835,	$16,857 91	
Amount paid mayor of the city of Lancaster,	16,857 91	
Amount drawn from the treasury for the payment of damages on the Columbia and Philadelphia railway,	$15,735 00	
Amount paid for damages on the railway from 11th May 1835, to November 1, as per statement D,	13,475 00	
Balance due commonwealth,		$2,260 00
Amount drawn from treasury for the purchase of locomotive engines on Columbia and Philadelphia railway,	$64,053 41	
Amount expended for locomotive engines from the 11th May 1835, to November 1, as per statement E,	57,653 41	
Balance due commonwealth,		$6,400 00
Balance in hands,		$13,076 48

JOSEPH MOSHER,
Superintendant of Columbia Railway.

NO. 2.

Report E. F. Gay, Principal Engineer.

Engineer Department,
Lancaster, October 30th, 1835.

To *Joseph Mosher, Esq.* Superintendent of the Columbia and Philadelphia Railway.

Sir—With the enclosed final estimate on the contract of Israel Cooper for the Parkesburg depot and workshops, I have to report, the *entire completion* of all the work which has been under contract during the past year. Dwellings for the accommodation of the men engaged in workshops, and a collector's office at Parkesburg, would have been placed under contract but for the want of funds to defray the expenses of their construction. These buildings were contemplated in my last report, and the want of means to erect them can only be attributed to these causes. First: The necessity of enlarging the new workshops beyond what had been contemplated, so as to meet the demand of a rapidly increasing trade on the road. Second: The application of a large portion of the construction fund to the payment of debts contracted on account of motive power, and Thirdly: To an inadvertance on my part, to include in the previous estimate, the cost of two small cargoes of railway iron, then on their way from England, and which arrived during the winter, subsequent to the completion of both tracks of the railway. This iron was originally ordered, with a view to its being laid on the "*Gap section,*" but in consequence of the unexpected difficulties met with in grading that section, it was thought most prudent to use wooden rails plated with iron, which plan was adopted, when it was too late to countermand the order for the edge rails. It is not however to be regretted that this iron is on hand, as a portion of the wooden track on the eastern end of the road is beginning to decay, and must soon be replaced with the edge rails and stone block track—the superiority of which, over wooden rails plated with iron, is now generally admitted.

In my last annual report, I recommended the grading of a road or carriage way along the south side of the Schuylkill inclined plane, with a view to render the bridge more valuable as a source of revenue to the commonwealth. In grading the road I had designed using the material excavated, to embank around the wings of the western abutment of the bridge. But as no appropriation was made for this work, and as the masonry of the bridge wings is still exposed to the action of frost, I have included in the estimate, an amount sufficient to make the embankment deemed necessary.

Estimated amount required for the construction of new work during the ensuing year.

Collector's Office, and dwellings for workmen,	$6,000 00
Embankment at west end of Schuylkiil bridge,	750 00
Fencing at Schuylkill and Columbia depot,	350 00
Contingent expenses of the line,	5,000 00
	12,100 00

Very respectfully submitted.

EDWARD F. GAY, *Engineer.*

NO. 3.

Report of E. F. Gay, Engineer, upon Motive Power.

Engineer Department, Columbia and Philadelphia Railway,
Lancaster, Oct. 30, 1835.

To the Board of Canal Commissioners of Pennsylvania:

GENTLEMEN—Having made report to the superintendent relative to the construction of works done, or contemplated to be done, on the railway, I proceed to comply with the further instructions of your secretary, by reporting to you the situation of the line, and the motive power upon it.

The superstructure of the railway has continued in an excellent condition during the past season; indeed, with the exception of the north track, on the eastern twenty-two miles of the road, (which is constructed chiefly of wood,) the permanent character of the railway is a sufficient guarantee that few repairs of importance will be required on it for many years to come. The substructure of the road is generally of a solid and substantial character; the viaducts are the only works which are liable to injury from the heavy travel over them. Three of the piers to the Little Conestoga viaduct, and one at Mill Creek, have been badly fractured, as they were defective in their original construction; they have, however, been properly secured with buttresses, and may now be considered in a safe condition. It is probable that one other pier at Mill Creek viaduct will require the support of buttresses in the course of another summer, which work the supervisor has included in his estimate for repairs. All the other viaducts are in a good condition. As the fears of the travelling community have been frequently expressed in relation to

the danger of these viaducts taking fire from the sparks emitted from the chimneys of the locomotives, it may be proper for me to remark that little fear need be entertained of fire from such a cause; this may be inferred from the fact that the cool atmosphere in the viaduct condenses the steam as it escapes from the exhaust pipes, and so moistens the surface exposed as to prevent ignition from the sparks; indeed, so rapidly does the steam condense during very cold weather in winter, that the water falls in drops from the interior of the bridge roof. Coals have sometimes fallen from the ashpan of the engine on the floor of the bridge; any danger, however, from this source, is obviated by a slight coating of gravel distributed over the exposed surface. Confidence, it is believed, may therefore be justly entertained, that so great a calamity as the destruction of one of these viaducts by fire need not be apprehended from the use of locomotive engines upon the road; yet it is by all means important that a watchful eye should continually be kept over them.

The inclined planes are, and have continued during the past season, in excellent condition. I am happy to state, that in the ordinary operation of ascending and descending the plane with the aid of the machinery, not a single accident of a serious nature has occurred during the past year. The operation of the planes are, however, always attended with more or less delay, particularly in damp weather when the adhesion of the rope is diminished, and the detentions which occur are exceedingly annoying to travellers, *the fault-finding part of which*, without stopping to inquire the cause, do not hesitate loudly to attribute it to the mismanagement of the public agents. So much has been said about the construction of railways to avoid the Schuylkill and Columbia inclined planes, that I was last summer induced to make a cursory examination, with a view to ascertain the fall and distance from a point on the railway near the Spread Eagle crossing, in Radnor township, by way of the Gulf Valley to the Schuylkill, thence along the Schuylkill to the west end of the viaduct at the foot of the inclined plane. The distance is found to be fifteen and one quarter miles, (about two miles further than by the present railway,) and the fall three hundred and eighty-one feet, being at the rate of twenty-five feet per mile. I did not, however, trace the line over the ground upon which the railway would be located, neither did my limited time allow me to take any notes with a view to estimate the cost of a railway upon that route; but, from general observation, I am of opinion that the undulating character of a large portion of the line would render the grading of a railway upon it decidedly expensive; it is, however, by no means impracticable, and is certainly worthy of a more minute examination. At the request of the citizens of Columbia, I have also made an examination, with plans, estimates, &c., of a line of railway to avoid the Columbia inclined plane; this line commences near the village of Mount Pleasant, and, passing down the valley of Strickler's run, crosses the present railway near the foot of the inclined plane, at an elevation of about twenty feet above the track, and enters Front street, in which it was designed to be continued to the basin; the whole

distance of five and one quarter miles being not more than one-third of a mile longer than the present line, and the graduation will not exceed thirty-four and a half feet per mile. The grade, however, can be reduced to thirty-three and one-third feet per mile, and a superior line be obtained, by keeping to the east of Front street after crossing the railway, and passing through what has been commonly termed the alley route, which will intersect the present railway on the east side of the basin, thereby affording additional facilities for the transaction of business. The grade, although higher than desirable, yet being within the limits of locomotive power, is deemed so much superior to the present arrangement, as to justify the opinion that the change is well worthy being recommended to the serious consideration of the legislature. The estimated cost of this change, if the rails are removed from the present line, is $110,000; or, if laid with a new wooden track, $133,360.

Motive Power.

At the date of my last annual report, two locomotive engines, viz: the Lancaster and Columbia, were in successful operation upon the line, and thirteen others had been contracted for, the most of which were expected on the road early in the spring. This anticipation however, was not realized, as but seven engines were in readiness to meet the demands of the spring trade, since which time the number has gradually increased to seventeen, viz: ten manufactured by M. W. Baldwin, Esq; five by Robert Stephenson, of England; one by Coleman Sellers & Sons; and one by Long & Norris, the two latter have been but recently put upon the road, and their capacity is not yet fairly tested; they are however, believed to be excellent engines. The engines from Mr. Baldwin have all been tested, and found to be of the first class. The five engines imported from England, are not as efficient as those manufactured in this country; the workmanship of them is good, but many important parts of the machines are too light to enable them to encounter (with a heavy load) the high grades and severe curves on this railway; in consequence of which, frequent repairs are required upon them. These engines were not obtained from England, (as has been generally supposed,) with the view of getting *better* engines than could be procurred in this country, but simply because locomotives could not be be manufactured here, fast enough to meet the wants of the road. My own opinion has always been in favor of encouraging the mechanics of our country in the manufacture of engines. Nothing but a suitable degree of encouragement is wanting to arouse the native enterprize of our mechanics to this inportant branch of business; and locomotive engines brought from England to this country for sale, will most assuredly find a *bad market.*

There are not at present a sufficient number of engines on the road to meet the current demands of the trade, as in consequence of repairs required, not more than two thirds of the number on the road can be kept in readiness for actual service. This deficiency will, however, be in a great measure diminished, whenever duplicates can

be obtained for such parts of the engines as are most liable to injury, and workshops can be properly arranged to do the repairs without loss of time. Indeed, the want of suitable workshops, during the past season, to do the repairs promptly, has materially lessend the amount of available power on the road. It may be asked, "Why these workshops were not built"? To this I can only reply, that it was last year contemplated to erect additions to the shop at Columbia, so as to do all the repairs at that end of the road; but before funds were provided for the prosecution of the plans proposed, the rapidly increasing trade on the road suggested the propriety of selecting a more central position on the line for their location. It was therefore thought most prudent to defer the matter for a month or two, that the proper point might be more clearly indicated, by the running of the engines. After due consideration of all the advantages and disadvantages, which seemed to have a bearing on the subject, it was early in July decided to erect the workshops, necessary to do all the repairs upon the road, at Parkesburg, being the point selected for the junction of the Oxford railway and the state works. This position embraces many advantages: such as being very nearly central; it is healthy, and has an excellent spring of running water for the supply of the engines. It may be proper here to remark, that a donation of all the ground required for the accomodation of the workshops, together with a lot for a collector's office, has been made to the commonwealth, by the owner, Mr. Parke. The depot and workshops are now finished, and in readiness for the reception of the tools, and machinery, which are in a state of preparation, and will probably be completed during the present month. It is to be regretted that the want of funds has not allowed the erection of the necessary dwellings, for the workmen connected with the shops, as boarding is difficult to be obtained in the vicinity, which will of course interfere with any system that may be adopted for the repairs, until an appropriation shall be made for the necessary buildings. When this is done, and the buildings completed, a proper degree of economy can be preserved in this important branch of the establishment. The engines upon this road have generally performed their trips with great regularity; and it affords me pleasure to add, that the American engines, delivered within the present year, are capable of doing more work than was estimated in my last report: the most of them, in their ordinary trips, draw a gross load of seventy-five tons. The engine Schuylkill has drawn over the road a gross load of *one hundred tons*, and several others have drawn, over the highest grade, from eighty to ninety tons gross. When the curves and grades upon this road are taken into consideration, it is believed that the performance of these engines will be found equal to any in America. It is also gratifying to me to be able to state, that most of the prejudice which existed along the line against the use of locomotive engines last year, appears to have vanished, and in its place arisen a prepossession in their favor: this, however, is nothing more than might reasonably have been expected, for certainly no intelligent individual can witness the performance of a single engine,

drawing a train of fifteen cars, loaded with three tons each, from one inclined plane to the other, (seventy-seven miles,) in eight hours, without honestly acknowledging the decided superiority of steam over horses—at least so far as its application to railways.

Of the twenty locomotives authorized to be obtained for this railway, seventeen (as has previously been stated) are upon the road, and the remaining three will probably be put on during the present month.

The cost of twenty engines, complete, will be	$126,000
Average cost of each, - - - - - -	6,300

As no separate account was kept, by the collectors, of the motive power received prior to the first of January last, and as all the expenses of that branch of the establishment were paid out of the construction fund up to the first of February, I am not able to furnish a comparison of the receipts and expenditures for motive power, previous to the latter date. The following statement will, therefore, exhibit its income and cost for nine months, commencing February first, and ending November first.

Amount received by collectors for motive power,	$46,514 98
Expenditures and debt, (see supervisor's report,)	45,431 75
Excess of receipts over expenses,	$1,083 23
If to this is added the excess of stock on hand over last year,	4,455 30
The actual excess over cost will stand,	$5,538 53.
Or, if from the expenditures,	$45,431 35
Be deducted stock on hand over last year,	4,455 30
The actual cost for motive power, for nine months, will stand,	$40,976 45
Or, average cost per day,	150 00

It is believed, that the receipts and expenditures of the ensuing year will be at least double the amount of the last; but, as with the present tolls they would probably progress in nearly the same ratios, the preceding result will afford safe data to estimate the value of the motive power to the commonwealth. Taking, therefore, ten engines as the average number upon the road during the past season, the cost of which, at six thousand three hundred dollars each, would be sixty-three thousand dollars—

Interest on which is,	$3,150 00
Deduct above interest from surplus receipts and stock on hand,	5,538 53
Balance left toward refunding the principal,	$2,388 53

This, it is evident, will not be sufficient, as the durability of an engine will probably not exceed four, or, at furthest, five years, which would render an amount of fourteen thousand dollars per annum necessary to replace the engines, or about eleven thousand six hundred

dollars more than the surplus of the present year, to each ten engines. It is believed, however, that a large portion of this amount would have been received during the past year, if all the tolls from passengers travelling on the road had been collected; but as this evidently has not been done, in order to remedy the evil, I would recommend that a careful and attentive agent of the commonwealth should be placed on each line of passenger cars, whose duty it shall be to keep a way-bill, in which he shall note the number of passengers in each car, and the distance travelled by them—and who should also see that the conductors of each car, or train of cars, keep a like way-bill, upon which the names of all passengers should be entered.—This plan, it is believed, would soon ensure an important increase to the revenues of the commonwealth. In order, however, to aid still further in obtaining a surplus fund for the renewal of engines, I would suggest the propriety of increasing the toll, for motive power, on each passenger, to one cent per mile. This change would probably, in connexion with the appointment of agents to keep way-bills, ensure a sufficient revenue to meet all demands upon the road for motive power.

In the following estimate of the amount required for motive power during the ensuing year, I have endeavored to include every expense that can be anticipated. It is still probable, however, that the rapidly increasing trade on this great thoroughfare may require additional expenditures, which cannot, at this time, be foreseen, but which may be found absolutely necessary before, in the ordinary course of business, a second legislature could act upon them. It seems to me, therefore, highly important that some especial fund should be provided, by which (if necessary) the agents of the commonwealth could meet any extraordinary demand upon the motive power, such as the opening of other rail-ways, which connect with the Columbia line, and which being in the progress of construction, would create.

Estimated amount required for the ensuing year.

Fifteen additional locomotive engines and tenders, at $6,400,	$96,000
One stationary engine for workshop,	2,000
Tools, machinery, &c. for same,	4,000
Additional water stations, reservoirs, &c.	1,800
Turn-outs, crossings, swivels, &c.	1,500
Sheds for night stands, at water stations,	2,000
Additional set of ropes at inclined planes,	3,300
	$110,600
If no arrangements should be made with a view of avoiding the planes, a second set of stationary engines will be required, which, with their erection, will cost	16,000
To which should be added the covering of the planes, recommended in my last report,	25,000
Total,	$151,600

Having in previous reports expressed my opinion in relation to the manner of using this railway, I deem further remarks on that subject unnecessary. The cars being at present owned by individuals are generally kept in good condition, and the owners appear uniformly well disposed toward making such repairs, or alterations, as they are from time to time directed to. A list of the cars now on the road, together with the reports of J. Mosher, Esq. late superintendant and J. S. Cash, present supervisor of transportation, are herewith presented, to which the board are respectfully referred for the details which form the basis of this report—it is believed that if early provisions are made for increasing the stock on this road, all the trade which may in future offer itself for transportation, can be fully and fairly accommodated, and that the revenue derived from it, will yield a valuable equivalent for the expenditures incurred.

All which is very respectfully submitted.

EDWARD F. GAY, *Engineer.*

NO. 4.

Report of J. Mosher, Superintendent, upon Motive Power.

To Edward F. Gay, Esquire,
Principal Engineer of Columbia and Philadelphia Railway.

SIR:—In compliance with the instructions given me by the board of canal commissioners, I herewith transmit a tabular statement containing the names of all the agents employed at the stationary and locomotive engines, with their duties, rate of wages, time of service, and amount paid to each; also the names of the persons engaged on the repairs of engines, their wages, time employed and amount paid to each. In statement marked B, the quantity of wood, coke, bituminous and anthracite coal, the cost per cord (including sawing and splitting,) ton, or bushel is given; the quantity of oil purchased and the cost per gallon, together with the amount paid for ropes, repairs of engines, and incidental expenses. Repairs of engines includes payment for iron, copper, castings, &c. used in shops, and shewing for what and to whom paid. Incidental expenses includes printing of notices, stationary used at planes, hauling engines on track, where run off, hauling engines to Broad street, hauling of wheels, tenders, &c. and to whom paid. This table closes with the amount paid for men and horses at inclined planes. The two tables show an expenditure of twenty two thousand eight hundred and sixty one dollars and forty cents, of which twenty two thousand two hundred and six

dollars and fourteen cents is already settled, and six hundred and fifty five dollars and twenty six cents, remains yet to be audited.

This expenditure only embraces services rendered, and articles purchased from the 2d of February last, when the law providing for the maintenance of motive power on the railways of this commonwealth was passed, to the 10th of July last, when my duties as superintendant of motive power ceased. An amount of six thousand five hundred and ninety two dollars and ninety eight cents, which had accrued for motive power prior to that time, was charged to the construction of railway, and paid out of the fund specifically appropriated to its completion.

The present charge for the use of motive power is believed to be sufficient for its maintenance, could it be collected, but experience proves that all the charge for motive power is not paid in. The competition between the proprietors of the different passenger cars is so great, that way passengers not entered on the way bills, have been carried by the agents for one dollar, a distance for which the charge for motive power alone would be forty one cents, exclusive of eighty two cents tolls. To correct this evil two modes are suggested—first, to place a state agent on each train of passenger cars; or, second, as the state furnishes the power, to also furnish the passenger cars. The expenditure for that purpose would not be heavy—the travelling community would be as well, if not better, accommodated—the tolls would all be collected, and at a moderate rate of fare would yield, in my opinion, a handsome revenue, to the state.

Respectfully submitted.

JOSEPH MOSHER,

Late Sup. of motive power on Col. and Phil. Railway

October, 29th 1835.

NO. 5.

Report of J. Mosher, Superintendent, upon cost of Locomotives.

TABULAR STATEMENT

Of Locomotive Engines employed on the Columbia and Philadelphia railway, with the names thereof, from whom purchased, time they commenced running, and their cost.

Names of Engines.	From whom purchased.	Time of running.	Cost.
Columbia,	M. W. Baldwin,		$5,580 04
Lancaster,	do.		5,850 00
Philadelphia,	do.		6,316 74
Pennsylvania,	do.		6,316 74

Names of Engines.	From whom purchased.	Time of running.	Cost.
Delaware,	M. W. Baldwin,		6,316 74
Susquehanna,	do.		6,316 74
Schuylkill,	do.		6,316 74
John Bull,	A. & G. Ralston,		6,422 83
Atlantic,	do.	June 18,	6,507 64½
Albion,	do.	July 4,	6,507 64½
Kentucky,	M, W. Baldwin,	July 23,	6,400 00
Firefly,	A. & G. Ralston,	July 24,	6,507 64½
Red Rover,	do.	July 27,	6,507 64½
America,	Coleman, Sellers & Son,	Sept. 1,	6,000 00
Juniata,	M. W. Baldwin,	Sept. 7,	6,400 00
William Penn,	Long & Norris,	Oct. 14,	6,000 00
Brandywine,	M. W. Baldwin,	Oct. 23,	6,400 00
			$106,667 35

JOSEPH MOSHER,
Superintendent of the Columbia and Philadelphia railway.
Oct. 29, 1835.

NO. 6.

Abstract of report on Motive Power.

Abstract of Motive Power—Report to 10*th of July*, 1835.

No.	Duties.	Salary.	Am't paid.
1	Foreman of machine shops,	$3 00,	$474 00
1	Manager of Schuylkill plane,	2 00,	120 00
2	Engineers of stationary engines at planes,	2 00,	388 00
11	Do. of locomotive engines,	2 00,	2,484 00
2	Firemen at stationary engines,	1 00,	191 75
27	Do. on locomotive engines,	1 00,	2,186 50
2	Signal men at inclined planes,	1 25,	261 25
4	Assistant signal men at planes,	1 00,	381 00
2	Riggers at inclined planes,	1 25,	274 37
4	Water-station men,	87½ and 1 00,	399 50
1	Watchman at Schuylkill plane,	1 00,	92 00
1	Attendant at switches, near Parkesburg,	1 00,	105 00
9	Smiths at workshops, average,	1 16,	863 49
			$8,210 86

Amount paid to agents of motive power, as above,				$8,210 86
Amount paid for fuel, as follows :				
Wood,	1382½	cords,	$6,286 50	
Coke,	1337	bushels,	342 50	
Coal, anthracite,	52	tons,	273 00	
Do. bituminous,	1430	bushels,	322 50	
				7,224 50
Amount paid for oil for engines, &c. 817½ gallons,				821 88
Do. for ropes,				318 18
Do. for horses at inclined planes,				3,221 00
Do. for repairs of engines,				3,003 75
Do. for incidental expenses,				182 22
				$22,982 39

Memo.

	Horses.	Men.
John Clark's check roll for February, 1835,	224	84
March, "	216	72
	440	156

440 Horses, at 75 cents,	$330 00
156 Men, at 87½ "	136 50
	$466 50

NO. 7.

Abstract of Receipts and Expenditures.

ABSTRACT STATEMENT

Of Receipts and Expenditures, on account of Motive Power, on the Columbia and Philadelphia railway, from the 2d of February to 10th of July, 1835: by Joseph Mosher, late superintendent.

To amount received from treasurer of canal commissioners, at sundry times, to be applied to the maintenance of motive power on the Columbia and Philadelphia railway,		$22,206 14
By disbursements on railway, per accounts and vouchers filed in auditor general's office,	$22,206 14	
By disbursements on railway, unaccounted for with the auditor general,	655 26	
		22,861 40
Balance due late superintendent,		$655 26

JOSEPH MOSHER,
Late Superintendent of Motive Power.

Oct. 29, 1835.

No. 8.

Report of J. S. Cash, Superintendent of Motive Power.

Office of Superintendent of Motive Power on the Columbia and Philadelphia Railway.

EDWARD F. GAY, Esq.
Chief Engineer Columbia and Philadelphia Railway.

SIR—In compliance with the instructions of the board of canal commissioners, I respectfully submit the following report:

The number of locomotive engines, the property of the commonwealth, is seventeen; their names, the number of miles they have travelled, the number of cars they have brought to and taken away from the Schuylkill depot, together with the expenses of maintaining the power, from the 10th day of July to the 31st day of October, 1835, with the stock of fuel, &c., on hand, is as follows:

Name.	No. of miles travelled.	No. of cars drawn.	Commenced running.
Schuylkill,	11,935	1495	May 18th
Delaware,	8,701	1102	Do.
Susquehanna,	9,933	1349	Do.
Pennsylvania,	8,162	998	Do.
Philadelphia,	8,624	1006	Do.
Lancaster,	7,777	853	Do.
Columbia,	5,544	575	Do.
Juniata,	2,156	394	Sept. 7th
Kentucky,	5,313	815	July 23d
America,	1,617	214	Sept. 1st
William Penn,	1,001	129	October 14th
John Bull,	3,927	316	May 18th
Atlantic,	6,468	562	June 18th
Albion,	5,390	470	July 4th
Red Rover,	3,311	170	July 27th
Firefly,	1,155	64	July 24th
Brandywine,	462	76	October 22d

Note.—This table exhibits the miles travelled and number of cars drawn from May 18th to October 31st, inclusive, but does not include such cars as have attached to the engines, and have not come through to the Schuylkill depot.

The expense for maintaining the power, for the period above stated, is as follows:

Paid for horse power, on Schuylkill and Columbia levels,	$2,935 11
Smiths, at Schuylkill and Columbia depots,	659 02½
Engineers, firemen, signalmen, managers, watchmen, &c. at inclined planes and depots,	1,163 50

Anvils, files, saws and other ironmongery for depots,		115 36
Engineers and firemen, on locomotives,		3,203 50
Men at water stations,		728 65
Fuel for locomotive and stationary engines,		3,339 92½
Hauling and sawing wood,		640 39
Oil,		698 19
Reflecting lamps for Schuylkill bridge, tin pipe for tanks in depot, repairs to tin roof of engine-house, oil cans, lamp glasses, wicks and repairs to lamps,		102 50
Stencil figures for marking cars,	$6 21	
Postage,	7 55	
Materials and painting signs for engines,	22 57	
Oil cans, horns, &c. for locomotives,	8 75	
Lime for whitewashing fence,	2 20	
Materials and making 2 flags for locomotives,	1 66	
Salary of superintendent of transportation,	240 00	
Six copper lanterns for locomotive and water stations,	13 50	
Wheels and repairs to wood cars and tanks,	321 30	
		$623 74
		$14,209 88

The following table, exhibits all who have been engaged in "managing, directing, taking care of, or superintending the motive power," viz: ☞ Those marked (*), are out of service.

Names of agents.	Duties.	Time of service.	Daily pay.	Am't paid to each.
John Bozarth,	engineer,	83 days	$2 00	$166*
John W. Hunter,	do.	75 "	do.	150
Samuel Watson,	do.	32½ "	do.	65*
Thomas Barlow,	do.	79 "	do.	158
George Rakestraw,	do.	77 "	do.	154
Solon Fleming,	do.	76 "	do.	152
George Gregory,	do.	82 "	do.	164
Henry H. Bush,	do.	82 "	do.	164
David Cockley,	do.	82 "	do.	164
Abm. Patterson,	do.	82 "	do.	164
George Murray,	do.	72 "	do.	144
Christian Vanhorn,	do.	33 "	do.	66
George Clark,	do.	28 "	do.	56
William Knight,	stationary engine,	82 "	do.	164
Thomas Barber,	do.	52 "	do.	104
William White,	manager,	61 "	do.	122
John Sener,	rigger,	17 "	1 25	21 25*
Thomas Snyder,	signal man,	16 "	do.	20*
George Sheaffer,	fireman,	76 "	1 00	76

Table continued.

Names of agents.	Duties.	Time of service.	Daily pay.	Am't paid to each.
Eli Williams,	fireman,	39 days	$1 00	$39
William Thomas,	signal man,	80 "	do.	80
William Childs,	do.	23 "	do.	23
Nathaniel Jackson,	do.	31 "	do.	31
Henry Harrison,	rigger,	57 "	1 25	71 25
Robert Carnahan,	signal man,	31 "	1 00	31*
Joseph Jenks,	rigger,	52 "	1 25	65
Charles Lay,	signal man,	52 "	do.	65*
Isaac Mason,	fireman,	52 "	1 00	52
Enos Mills,	signal man,	52 "	do.	52
William Wilson,	do.	52 "	do.	52
Thomas Rome,	fireman,	82 "	do.	82
John Mellinger,	do.	81 "	do.	81
Patrick Smith,	do.	52 "	do.	52
Harvey French,	do.	82 "	do.	82
L. H. Robinson,	do.	82 "	do.	82*
Jacob Downing,	do.	74 "	do.	74
Smith Lake,	do.	21 "	do.	21
Patrick Downey,	do.	103 "	do.	103
Robert Robinson,	do.	78 "	do.	78
John O'Donnell,	do.	70½ "	do.	70 50
Patrick M'Afee,	do.	71 "	do.	71
John M'Williams,	do.	59 "	do.	59
Lewis Jordan,	do.	60 "	do.	60*
Daniel Tindall,	do.	58 "	do.	58*
Joseph Gregory,	do.	29 "	do.	29
John Houston,	do.	52 "	do.	52*
Fabius Fleming,	do.	33 ",	do.	33
Thomas Litchfield,	do.	82 "	do.	82*
John Armbrister,	do.	13 "	do.	13*
H. A. Montgomery,	do.	35 "	do.	35
John M'Kinley,	do.	19 "	do.	19*
Timothy Green,	do.	22 "	do.	22*
T. G. Kerns,	do.	29 "	do.	29
Nicholas Clair,	do.	15 "	do.	15*
John Ingram,	do.	20 "	do.	20
Henry Dehuff,	do.	38 "	do.	38
Robert Carnahan,	do.	27 "	do.	27
Thomas Sirlee,	do.	49 "	do.	49
John Daley,	do.	30 "	do.	30
John Linton,	do.	8 "	do.	8*
William Dormis,	waterman,	52 "	do.	52
Robert Vernon,	do.	52 "	do.	52*
Samuel Mitchener,	do.	52 "	do.	52
Levi Moore,	do.	52 "	do.	52
Nelson Mitchener,	do.	112 "	do.	112

Table continued.

Names of agents.	Duties.	Time of service.	Daily pay.	Am't paid to each.
Peter Donnelly,	waterman,	52 days	$1 00	$52
John Hutchinson,	do.	52 "	do.	52
Hugh Campbell,	do.	52 "	do.	52
Isaac Smith,	do.	82 "	do.	82
Elijah Loudon,	do.	82 "	do.	82
Smith Lake,	do.	26 "	do.	26
Joseph Butler,	do.	66 "	do.	66
Adam Wagner,	do.	20 "	do.	20
John Beck,	do.	52 "	do.	52
John Weiler,	signal man,	80 "	1 25	100
John Brandt,	master machinist,	82 "	3 00	246
John S. Cash,	sup. motive power,	60 "	4 00	240
Conrad Weigandt,	smith,	9 weeks	8 00 per w'k	72
Henry Tallman,	do.	12 "	11 00 "	132
John Quinn,	do.	15 "	7 00 "	105
Joseph Gregory,	do.	21 days	1 00 per day	21
Henry Sheaff,	do.	46 "	1 33⅓ "	62 31
George Clark,	do.	16 "	1 00 "	16
Geo. Peterman, jr.	do.	26 "	1 50 "	39
Do.	do.	17 "	1 65 "	28 05
James M'Gannon,	do.	5 "	1 00 "	5
John Mills,	do.	11 "	1 33⅓ "	14 66⅔
Henry Kammerer,	do.	24 "	1 00 "	24
Isaac Reifsnyder,	do.	9 weeks	8 00 per w'k	72
Amos Pitt,	do.	4 "	7 00 "	28
Samuel Warner,	do.	4 "	10 00 "	40

The average cost of running the locomotives is about $15 20 per trip of seventy-seven miles, viz:

1½ cords wood, average price $3 65 per cord, is	$5 47½
15 bushels bituminous coal, at 28 cents per bushel,	4 20
Pay of engineer and fireman,	4 00
6 quarts of oil, at 25 cents per quart,	1 50
	$15 17½

The stock of fuel on hand is as follows:

Bituminous coal at Schuylkill depot, 7760 bushels, at 28 cents,	2172 80
Wood at depots, and wood stations, 450 cords at 3 65 per cord,	1642 50
Anthracite coal at Columbia depot, 500 tons at 3 50 per ton,	1750 00
Anthracite coal at Schuylkill depot, 20 tons, at 4 25 per ton,	90 00
Iron at the depots valued at	600 00
Stock on hand,	$6,255 30

The following is the amount received on account of motive power.

1835, August 15th, draft on A. Mahon, Esq. State Treasurer,	$3,500 00
1835, September 3d, draft on A. Mahon, Esq. State Treasurer,	2,500 00
1835, September 14th, draft on A. Mahon, Esq. State Treasurer,	3,000 00
1835, September 28th, draft on A. Mahon, Esq. State Treasurer,	4,000 00
	$13,000 00

The amounts received by the collectors for "motive power" from the 10th day of July, up to the 31st day of October, both days included, are as follows:

Collector at Philadelphia,	$11,635 76
Do. at Paoli,	341 62
Do. at Downingtown,	2,667 11
Do. at Lancaster,	1,358 24
Do. at Columbia,	12,449 64
	$28,452 37

Estimated debt of motive power.

Due for horse power,	$870 00
Do. repairs of engines,	1,700 00
Do. fuel (wood and coal,)	1,758 00
Do. iron and brass founders bill,	905 47
Do. A. & G. Ralstons for duplicate of locomotives, (about)	1,500 00
Do. oil, &c.	1,627 00
	$8,360 47

Columbia level, twelve men employed at 58 cents each, per day; sixteen horses employed at 49 cents each, per day.

Schuylkill level, fourteen men employed at 69 cents each, per day; thirty-two horses employed at 60 cents each, per day.

The receipts for "motive power" are believed to be sufficient to defray the expenses and keep locomotives in repair. It is supposed that a full and fair return of the way passengers, carried in the passenger cars, has not been made. Passengers have been carried for less price than the toll and motive power. The appointment of riding agents on the part of the commonwealth, whose duty it should be to register the distances travelled by such passengers, would, it is believed, effectually remedy this evil.

I would earnestly urge that the central workshops should be completed and furnished with all the necessary implements as speedily as possible: great delays have occurred in the repairs of engines for the want of a suitably furnished shop. Another cause of delay is the difficulty of procuring tire for driving wheels; we have relied mainly

upon the importers in Philadelphia, but as yet without success: it is said sufficient encouragement is not given to manufacturers of iron in this country to induce them to turn their attention to it.

Many of the accidents by which the engines have been injured, have resulted from the careless manner in which the switches of private sideings and turnouts are left upon the main track—a suitable regard to the safe use of the railway upon the part of the occupiers, would greatly diminish their liability.

Respectfully submitted.

JOHN S. CASH,
Superintendent of Machinery and Motive Power.

Philadelphia, October 31*st*, 1835.

EASTERN DIVISION.

NO. 9.

Report of J. C. M'Allister, Superintendent.

CANAL OFFICE,
Columbia, October 31, 1835.

To JAMES CLARKE, ESQ.
President of the Board of Canal Commis's of Penn'a.

SIR—In compliance with the directions of your secretary, contained in his letter of the fifteenth inst., I have made out and now transmit to you a statement of the amount of expenditures, and the amount paid upon the Swatara feeder and on the 8.71 miles of the Columbia line, Eastern division, Pennsylvania canal, from the first November, 1834, up to 31st October, 1835, as will appear by the subjoined tabular statements, and an abstract statement, giving answers to nearly all the questions put: all which I hope you will find satisfactory. It gives me pleasure to state, that all the work under contract, on the aforesaid lines, at the period of the last annual report, has been completed; and the feeder has been in practical use since the first of June last.

Yours, respectfully,

JOHN C. M'ALLISTER,
Late Superintendent.

ABSTRACT.

Amount of moneys in hand at the last report of old work fund, and for new work upon old lines,	$2,259 23	
Do. balance of appropriation for new work,	828 55	
		$3,087 78
Amount drawn from the fund for new work upon old lines, since last report,		2,585 26
Do. from the fund to pay new contracts upon finished lines, of the appropriation of 13th April, 1835,		33,023 98
		$38,697 02
Expended as follows:		
On the 8.71 miles and old 10 miles of the Columbia line, as per table No. 1,	$11,604 10	
On the Swatara feeder, as per table No. 2,	23,484 65	
Engineering, as per table No. 5,	2,423 50	
Fencing, as per table No. 4,	597 27	
Incidental, as per table No. 3,	226 58	
		38,336 10
Balance on hand,		$360 92
Amount of damages paid from 1st November, 1834, until 31st October, 1835,		$4,760 85
Amount of moneys in hands at the last report, out of the damage fund,	$3,846 65	
Amount drawn from the fund since last report,	914 20	
		$4,760 85

NO. 10.

Report of Edward F. Gay, Engineer.

ENGINEER DEPARTMENT,
Lancaster, October 30, 1835.

To the Board of Canal Commissioners of Penn'a.

GENTLEMEN—The line of canal under my charge, extending from North island, on the Juniata division, to Columbia, on the Eastern division, has (with the exception of a few days' interruption, by breaches, on the Eastern division) continued in a good navigable condition during the past season. From a recent examination of the line, however, I am enabled to state, that many important repairs

will be required during the winter, upon a portion of the mechanical work, to place it in a condition to sustain an active navigation for the ensuing season.

On the Juniata line, the following repairs will be required, viz:

The stone lying on the top of the east dam at North's island, must be removed, and its place supplied with gravel, to prevent the leakage, which causes a deficiency in the supply of water for the canal, during the autumnal months.

The renewal of a portion of the plank facing at lock No. 1, is also necessary, together with an alteration of the foot of the sluice around the lock, so as to divert the current of water, which at present impedes the progress of boats to and from the chamber of the lock.

Lock No. 6, being the outlet lock at Duncan's island, requires new sheet piling.

On the Eastern division—

Guard lock No. 1, at Clarke's Ferry, requires a new set of gates entire.

Lift lock No. 1 requires new upper gates, and a new sluice around the lock. The upper end of one of the piers at Clarke's creek aqueduct, is badly fractured, and will require rebuilding, or a new buttress. Lock No. 2, has always been in a leaky condition, from defects in its original construction: it will require new sheet piling, and a plank facing around the head walls, which, with the joists being carefully closed with cement, will probably admit of the lock being used for a year or two longer. It should, however, be rebuilt; but as *this* could not be done without suspending the navigation on the canal, and as double locks will soon be required, I would recommend that a new lock be built beside the present one, as early as possible. This can be done without suspending the navigation; and when done, it will supply the place of the old one, which can then also be built without inconvenience to the navigation.

The trunk of the Fishing creek aqueduct is decayed, and must be renewed. Lock No. 3, requires new head walls and sheet piling. The joists must also be carefully closed with cement. New gates are prepared for locks Nos. 4, 5 and 6, and will be put in as soon as the navigation closes. The east side wall of lock No. 8, appears to be defective, and should be rebuilt, or secured with buttresses, which latter plan would probably preserve the walls from further injury.

The remainder of the locks upon the division (lock No. 10 excepted, which requires new sheet piling) are all in a good condition. All the sluices, however, around the locks, require enlarging and improving at the ends, so as to admit a more bountiful supply of water to pass from the upper to the lower levels. A horse bridge over the canal seems to be required, for the accommodation of the public, at or near the Conewago aqueduct, there being no bridge within one mile of that point. The rebuilding of six bridges will be indispensably necessary during the ensuing winter or spring.

The preceding statement embraces all the repairs of importance upon the line which should be attended to previous to the opening of the navigation next spring—the cost of which I have estimated at

six thousand five hundred and fifty dollars, exclusive of a new lock at Stony creek, which, if it should be deemed advisable to commence, and it be built of cut stone, would require an additional appropriation of nine thousand dollars. The Swatara feeder was finished early in June last, and is believed to be fully adequate to supply all the demands of the most active navigation upon the canal, to Columbia.

Very respectfully submitted,

EDWD. F. GAY, Engineer.

JUNIATA AND WESTERN DIVISIONS.

NO. 11.

Report of J. K. Moorhead, Superintendent, Juniata Division.

Huntingdon, Nov. 1st, 1835.

JAMES CLARKE, ESQ.
President of the Board of Canal Commissioners of Penn'a.

SIR—The construction of the Juniata division has been entirely completed during the last season, and the canal is in good navigable order at present. From the date of my last annual report, (viz: Nov. 1st, 1834,) to the first of April, 1835, at which time my resignation took effect, I disbursed out of the fund for the construction of the Frankstown line, nine hundred and ninety-nine dollars and two cents, to the following persons, viz:

Frankstown Line.

George W. Patton, (advertising,)	$2	00
P. W. Mathews, materials for fencing,	10	62½
Peter Good, do do	6	00
John Walker, do do	3	20
John Wertz, fencing,	210	00
William Johnson, do	50	40
Aaron Burns, do	40	00
Keys & Sheaffer, do	14	00
John Lytle, weigh-master's house,	358	28
Joseph Adams, sundries at weigh-lock,	118	54
Michael Riley, ditching at do	6	25
Jeremiah M'Naughton, stone work,	2	37½
James Goulden, irons for lock,	3	08
John Dearmit, hinges for gate,	2	12½

Frankstown Line—Continued.

Hiram Grady, pumps at lock,	$29 00
Isaac Dorland, postage,	35 15
Isaac Dorland, filling up deeds,	1 50
J. K. Moorhead, 130 days services,	65 00
J. K. Moorhead, 1 year office rent,	30 00
Do do 6 cords wood and 20 lbs. candles,	11 50
	$999 02

As the office of superintendent was abolished on this division, on the first of April last, there will be no charge for that service after that date. The principal engineer, Sylvester Welch, Esq. receives his pay out of funds appropriated to the Portage rail road.

During the portion of the year that I remained in office, I made the following disbursements out of the damage fund, viz:

Damages paid.

	On resolution of the canal commissioners—		
To	Alexander Seawright,	$50	
	James S. Charlton's heirs,	250	
	Samuel Morrison,	100	
	James Martin,	140	
	Arthur Crawford,	75	
	James Dunn,	100	
	Samuel M'Nare,	25	
	James M'Cahan,	300	
	Joshua Longstreth,	60	
			$ 1,100
	On awards of the appraisers—		
To	Benjamin Elliot,	$400	
	Henry Miller,	1,000	
			1,400
			$2,500

I also made the following disbursements out of the old work fund, amounting in the aggregate, to sixteen hundred and ninety-eight dollars and fourty-four cents, viz:

Lewistown Line.

Robert Stockton, supervisor, for new pier at rope ferry as follows, viz:

James M'Cafferty, check roll,	$ 68 25
Do do do	216 06
Do do do	223 27
David Mitchell, timber,	125 73
Robert Mitchell, do	60 12
J. & S. Beaver,	39 60
James R. Gilmer, smith work,	54 13
Amount paid Stockton,	$787 16

Amount paid Stockton,	$787 16
James S. Espy, locks No. 9 & 10,	622 50
Ennis & M'Gee, fencing,	119 78
Huntingdon Line.	
David Jenkins, for lot,	50 00
Henry Shaver, fencing,	117 00
Charles M'Dowell, printing	2 00
	$1,698 44

Respectfully submitted,
J. K. MOORHEAD,
Late Superintendent, Juniata division Pennsylvania canal.
Huntingdon, Nov. 1st, 1835.

NO. 12.

Report of S. Jones, Superintendent, Western division.

JAMES CLARKE, ESQ.
President of the Canal Commissioners.

SIR—At the time of communicating to the board my last annual report, the amount estimated as necessary to complete the work then under contract and unfinished, &c. was seventeen thousand four hundred and seventy-eight dollars and sixty-four cents. Now, with the exception of the shed over the weigh-lock at Johnstown, all the work for which the said sum was appropriated has been finished; and the following disbursements have been made upon the several contracts since the first of November last:

Ligonier line—Weigh lock, Johnstown,	$3,743 50		
Dwelling for weigh-master, do.	530 00		
Collector's office, do.	1717 06		
Scale for weigh-lock,	1642 89		
Bridge, &c. over weigh-lock,	2539 40		
		$10,172	85
Fence at locks Nos. 25 and 26,	35 60		
Do. do. 29,	31 20		
Do. do. 23,	42 40		
Kis. & Con. line—Fence on section No. 123,	80 00		
		189	20
Stony creek feeder—Draw bridge,		75	00
Ligonier line—Wall on section No. 32,	612 50		
Lock No. 25,	80 00		
		692	50

Kisk. line—Water ways at locks Nos. 3, 7, 8, 9, 10 & 11,		300 00
Pittsburg line—Sewers at Grant's hill,		4,587 42
Incidental and miscellaneous—		
Hauling and packing hydraulic lime,	$242 99½	
Miscellaneous,	469 97½	
		712 97
Amount paid as per estimates, &c.		$16,729 94
Amount paid salary of principal assistant engineer on Western division, &c.		1,408 00
Total sum paid on the Western division, since first November last,		$18,137 94

The balances yet due on contracts, are for work done on weigh shed and for water ways; but these are not so great as to make the whole sum to be paid exceed the estimated amount required, to any considerable extent.

Of the damages awarded by the board, the following have been accepted and paid, since the last report:

To Samuel Coneton,	$100 00
S. Russel,	80 00
A. Hosack,	10 00
P. Smith,	600 00
	$790 00

The Western division is at present in excellent condition; and it gives me pleasure to state that, duriug the present season, no breaches have occurred.

Respectfully submitted,

S. JONES, Superintendent.

Canal Office, Hollidaysburg, Dec. 12, 1835.

NO. 13.

Report of S. Welch, Engineer, upon a reservoir for the Western Division.

Engineer's Office, Johnstown, November 22d, 1834.

To JAMES CLARKE, Esq.

President of the board of Canal Commissioners.

SIR:—In compliance with the directions of the board, I have examined the country along the Little Conemaugh river, and along a

portion of Stony creek for the purpose of selecting a suitable site for a reservoir for the western division of the Pennsylvania canal.

There is no point on the main branch of the Little Conemaugh, where a reservoir capacious enough for the purpose required, can be made, without overflowing the rail road. The Ebensburg branch is too small to afford a sufficient quantity of water. The South Fork, which rises in the Cedar Swamp near the summit of the Allegheny mountain, and unites with the main river about eight miles above this place, is the only branch of the Little Conemaugh which drains a district of country large enough to afford an ample supply. This stream discharges a quantity sufficient to fill a reservoir of any desirable extent. In summer it is nearly as large as the main branch.

The most favorable ground for a resorvoir on the South Fork, commences about two miles above its mouth, and extends up the stream about two and a fourth miles.

The flat which would be covered with water, varies in width from eight hundred and forty, to about four thousand feet, exclusive of the lateral ravines or valleys which extend out from both sides of the principal valley.

The accompanying map shows the extent of ground which would be covered, by a dam which would raise the water sixty feet at bench mark No 1. This dam or mound of earth and wall, would be fourteen hundred and forty five feet long. The quantity of water which the reservoir would contain, is estimated at a little more than four hundred million cubic feet, and the surface would cover about four hundred and thirty five acres of ground.

The ground at bench mark No 3, is seven feet higher than at No 1. A dam of the same height at No 3, would raise the surface of the reservoir seven feet higher, or it would make the water seven feet deeper than the marks on the map represent it. The surface would also be extended on the sides and at the upper end beyond the line represented in the map. A dam at this point would be eight hundred and forty feet long. The reservoir would contain about four hundred and eighty five millions of cubic feet of water, and the surface would cover about four hundred and seventeen acres of ground. This appears to be the most favorable site for a dam. The distance across the valley is less than at any other point above or below it, and it appears from the measurements made, that a dam of the height proposed, placed here, will form a reservoir of greater capacity, than one placed at any other point above or below. The valley increases in width above the upper end of the proposed reservoir, but the inclination of the ground is too great to make it available without a dam of very great height.

The site of the proposed reservoir with the exception of one small field, is covered with timber. The adjacent country for some miles in extent, is principally a forest, and the land is of comparatively little value.

The enclosed diagram represents a section, through the centre, o a dam which I would recommend for adoption by the board. The wall and puddle bank should be commenced if practicable upon the

solid rock. The slope towards the water should be made of materials that would be impervious to water. The lower slope may be made of coarse heavy materials of any description.

The sluices for letting out the water may be made at any point in the bottom of the dam, where a substantial foundation can be had. A channel sufficiently capacious to discharge the waste water during freshets should be cut out of the hill, at one end of the dam. The hill at both ends of the dam, with the exception of a thin layer of earth on the surface, is formed of rock. The bed of the channel would therefore consist of solid rock and not be liable to wear away. The water would not in any event pass over the dam.

Estimated cost of the reservoir, including the building of the dam, clearing the ground of timber, &c.

Clearing a site for the reservoir, 417 acres, at $15,	$6,255 00
19,000 perches of rubble wall laid with hydraulic lime, at 2 50,	47,500 00
14,000 cubic yards of excavation in puddle ditch, channel, &c. at 25,	3,500 00
41,000 cubic yards of puddling, at 25,	10,250 00
256,000 cubic yards embankment, at 20,	51,200 00
Contingencies, including gates and sluices,	9,000 00
	127,705 00

If the wall be taken out, and its place supplied by puddled embankment, the cost of the reservoir would be reduced to $84,603 00.

The surveys upon Stony creek were made with a view to the construction of a dam across the main river, forty feet high. The most favorable site appears to be at the point marked upon the map, bench mark No. 4, near the head of Vicroy's mill race. A dam forty feet high at this point would overflow about three hundred and sixteen acres of ground, and the quantity of water would be equal to about two hundred and sixty one and a half millions of cubic feet. A dam of the same height at bench mark No. 1, would overflow about three hundred and fourteen acres, and the capacity of the reservoir would be equal to about one hundred and ninety and a half millions of cubic feet. Neither of these reservoirs would be sufficiently capacious for the purposes required, and either of the dams, with the defences necessary to secure them, would cost as much, or more than the proposed dam on the South Fork.

No examinations have yet been made of the upper parts of Stony creek or its branches. It is probable that favourable sites for reservoirs may be found on these.

In the dryest part of the summer the quantity of water in the Conemaugh river, at the junction of Little Conemaugh and Stony creeks, appears to be nearly the same as it is at Leechburg, where the last feeder is taken into the canal. The water supplied by the tributary streams is not much more than equal to the quantity lost by evaporation. The gradual reduction of the surface of the pools on the upper parts of the river, until they fall to the low-

est point that will admit of the passage of boats, keeps up a supply of water on the lower part for three or four weeks; but if the dry weather continues for eight, ten, or twelve weeks, the water in reserve becomes exhausted, and the quantity available for the purposes of navigation, appears to be nearly the same at all points where feeders are taken in. The surface of the Leechburg pool is equal in extent to about four hundred acres. The wear is about one foot higher than the top water line of canal, and the surface may be reduced one foot after the water has ceased running over the dam, without interfering with the passage of full loaded boats. This reserve of water (equal to about 17,264,000 cubic feet,) has not been exhausted this season, and the canal from Leechburg to Pittsburg, 35 miles in length, has been at all times fully supplied, except when the water was drawn off to repair breaches.

The whole quantity of water required for the supply of this part of the canal in August and September, when the land springs and runs are dry, averages about ninety cubic feet per mile per minute; or 3150 cubic feet per minute for the thirty-five miles. In addition to this, about 1500 feet per minute should be allowed for lockage water, which will be required for an extensive trade, making the quantity required about 4650 cubic feet per minute.

All the other canals on the Western division are much shorter than this—the longest does not exceed fourteen miles—each one is fed from a pool, formed by a dam, built across the channel of the river, and the water at the lower end is discharged into a similar pool which feeds a succeeding canal. All the water which leaks through the bank, &c. except that which is lost by evaporation, regains the channel of the river and passes into the next pool below. There is no absolute loss of water by lockage above Leechburg, nor by leakage, except so far as it augments the evaporation.

The estimated quantity of water required to supply the canal from dam No. 3, to the head of the pool of dam No. 2 of the Ligonier line, (this being the longest canal between Johnstown and Leechburg) and the one which requires the greatest quantity of water, is as follows:

Allowing 200 boats per day, and each lock full of water, including waste, to equal 15000 cubic feet, we have $200\times15{,}000\div1440$ minutes=per minute,	2083 cubic feet.
14 miles of canal, at 90 feet per mile, per minute, $14\times90=$	1260
Making	3343 cubic feet.

Experience has shewn that this canal requires a much greater quantity of water than any other on the Western division, except that from Leechburg to Pittsburg. The Conemaugh river at this place, or at dam No. 3, above referred to, will, at its lowest stage, supply for the canal, about 1700 cubic feet of water per minute, or 2,448,000 cubic feet per day. At Leechburg the Kiskiminetas will probably furnish about 2200 cubic feet per minute, or 3,168,000 cubic feet

per day. The quantity of water required for the canal from Leechburg to Pittsburg, with a trade requiring the passage of 200 boats per day, is estimated at 4650 cubic feet per minute, or 6,696,000 cubic feet per day. The canal, between dam No. 3, and the head of the pool of dam No. 2 of the Ligonier line, is estimated to require 3343 cubic feet of water per minute; or 4,813,900 cubic feet per day.—There would be required from the reservoir for the last mentioned canal, 1643 cubic feet per minute, and for the first 2450 cubic feet, per minute, or 3,528,000 cubic feet per day. The last mentioned quantity would be that which would be required from the reservoir during each day, while the river continued at its lowest stage.

The reservoir is estimated to contain about 485,000,000 of cubic feet. If the surface be reduced by evaporation during the dry season eighteen inches, equal to about 27,000,000 cubic feet, there will remain for the use of the canal 458,000,000 cubic feet of water. This, at the maximum quantity required for the passing of two hundred boats per day, will, in addition to the water that flows naturally in the river, supply the canal for a period of nearly one hundred and thirty days without any augmentation from rain.

In making the above estimate, the quantity of water lost by evaporation, from the channel of the river and from the canal, is not taken into consideration, as it is supposed the evaporation will not be increased by adding to the quantity of flowing water in the stream.

Respectfully submitted.

SYLVESTER WELCH, *Engineer.*

NO. 14.

Report of S. Welch, Engineer upon the Juniata and Western Divisions.

Engineer's Office, Johnstown, Oct. 31st, 1835.

To James Clarke, Esq.
President of the Board of Canal Commissioners.

Sir—I have the honor to communicate, for the information of the board, the following report on the state of the canals under my directions, as principal engineer.

The Juniata and Western divisions continued open for navigation last season, with some slight interruptions from ice during the month of December, until the first day of January. They were opened again throughout their whole extent about the 17th or 18th of March, which is about ten days later than in common seasons. The transportation was suspended seventy-seven days. During the present season there has been but little interruption to the passage of

boats either by breaches or otherwise except for about two weeks in September, near Hollidaysburg, on the Juniata, when heavy boats were a good deal impeded by low water.

Juniata Division.

The face of the banks on this canal, where they are not covered with a wall, have been considerably abraded during the summer, by the wave produced by the fast running boats; the supervisors have, in many places secured the banks by facing them with a wall, or covering them with small stones, but a good deal of this kind of work remains to be done during the coming winter.

The dams on the whole division are in good order, and appear to be secure from injury by floods. The gates of the river lock at the dam near Lewistown, were broken down by the floods last spring; a strong bank has been made across the head of the lock, to prevent the water from passing through, and injuring or tearing away the lock and end of the dam. If it is not intended to have this lock repaired and kept in use, the head of it should be cut away, and the dam, which is now too short, should be extended about one hundred feet into the bank.

Of the aqueducts, those on the Frankstown line are all in good order, except that near Alexandria, the superstructure of which should be rebuilt before the canal opens next spring. On the Huntingdon line, the small aqueducts will require but little repair, the large ones, over the Juniata at Jack's narrows, and Shaver's ford, both require repairs to a considerable extent; they should be put in good order during the winter.

On the Lewistown line, the timbers in all the aqueducts are a good deal decayed, but I think with a little repair, they may be regarded as safe for another season, after which it will be necessary to rebuild them.

The locks on the Frankstown line are all in good order except one—lock No. 10. The timber face of this should be renewed, while the water is out of the canal during the winter.

On the Huntingdon line the locks require but little repair; the gates, however, are becoming decayed, and provision should be made next season for renewing them. A house should be built next season at the fifth lock below Lewistown.

On the Lewistown line where the locks are built partly of wood, the timber and plank are a good deal decayed; the timber part of three of them at least, if not four, should be renewed during the coming winter. New gates will be required for a large portion, if not all the locks on this line next season. All the culverts on this division are in good order.

The bridges on the Frankstown line are generally in a good condition; repairs to a small extent only, will be required. On the Huntingdon line they are more decayed, and will require more work to be done at them, to keep them in order during the season.

A guard lock should be built in the canal, some distance below the present gates, on the Long narrows, which will cost about six thousand dollars.

Provision should be made to renew several of the bridges on the Lewistown line next season, or during the coming winter.

Western Division.

The face of the banks of this canal have been a good deal abraded by the wave of the fast-running boats. This wave cuts out the soft earth, and leaves a bench a little below the surface of the water. Portions of the banks thus cut away, have been secured by walls; other portions have been secured by filling the space excavated with small stone, which, when well put in, appears to answer as good a purpose as a wall.

There is a good deal of the bank yet to be secured, and it can be done to a considerable extent during the winter.

The dams on this division are all in good order, and are secure from injury by floods.

On the Ligonier, Kiskiminetas and Conemaugh, and Kiskiminetas lines, the aqueducts are in a good condition; they require but little or no repairing. On the Allegheny line, the small aqueducts are all in bad order. The wood work of all of them should be renewed altogether, or in part, during the coming winter. The large aqueducts over the Allegheny river, are in a good condition. The new arches, which were put in by the supervisor during the last winter, are found to be abundantly strong to bear up their load; and, from present appearances, but little expense or labor will be required to keep them in order for many years. The only danger to be apprehended to these aqueducts is in the foundations of the piers; these should be well protected, by keeping constantly a mass of rubble stone around the bottom of each, to prevent the current from excavating too near the piers.

Some of the locks on this division require repairs.

A part of one side of No. 6 of the Ligonier line, is considerably pressed in, by the slipping of the side hill, which lies against it. About two thirds of one wall should be taken down and rebuilt during the next winter.

Several of the other locks leak considerably through the walls. The lock-gates on the Ligonier line are generally good, and will last from one to two years longer. On that part of the canal between Blairsville and Pittsburg, they are more decayed. Several new gates have been made for the locks on the Kiskiminetas and Allegheny lines, and more are required.

The locks on this division could be put in good order (except No. 6 of the Ligonier line) in a few days of mild weather, but it is exceedingly difficult in winter to fill the walls with mortar, so as to prevent their leaking, as the frost will destroy, at night, the work done during the day.

The culverts on this division are all in good order.

The bridges require a good deal of repair, and many of them must be rebuilt before the end of another season. Almost all the bridges on this canal are supported by trussels of timber as a substitute for abutments.

In the bridges that were first built, as those on the Allegheny and Kiskiminetas lines, the trussels are so much decayed as to make it necessary to replace them either with abutments of stone, or with new frames of timber. The superstructures of many of the bridges are also decayed and must be renewed. When the bridges are rebuilt, I would recommend that abutments built of rubble stone, laid in common lime mortar, be substituted for the wooden trussels.

The weighlock scale, and weighmaster's house at Johnstown, which were in progress at the date of my last report, are completed, and have been in use during the whole season. The shed over the weighlock is not yet quite finished. The sewer at Pittsburg on the Monongahela side is finished—that on the Allegheny side was finished as far as the state of the water in the river would permit, and was taken off the contractor's hands, and paid for.

The canal commissioners passed a resolution on the 22d of September last, directing the engineer to make an estimate of the cost of extending the sewer into the river agreeably to the plan previously adopted, and directing the supervisor to enter into contract with the owners of the adjoining lots to finish the work, provided that the contract price for the same, should not exceed the engineer's estimate, and provided that the contractors bind themselves to build, at their own expense, a good and sufficient protection for the extension of the sewer.

The estimated cost of extending the sewer into the river and building the head of the arch is $446 75. No contract has yet been made for it; the water of the river has been too high to allow he work to be done.

The filling up of the thorough cut, over the Grant's hill tunnel, and the extending of the arch of the tunnel, directed by a resolution of the board, of the 20th of April, have been put under contract, and the embankment in the cut is nearly finished. The extending of the arch will probably not be completed this season, in consequence of the inability of the contractors to procure materials. The contracts were let at very low prices. The price of labor and materials, advanced soon after they were let, which has occasioned delay in the progress of the work, and will probably result in loss to the contractors.

Estimated cost of filling the cut over the tunnel.

31,700 cubic yards of embankment at 7½ cents per cubic yard,	$2,377 50
Work estimated amounts to	1,800 00
Amount required to complete the filling,	$577 50

Estimated cost of extending the arch, and filling in over it.

300,000	bricks, at $8 50 per 1000,	$2,550 00
329	perches hammer dressed masonry, at $3 50,	1,151 50
695	do rubble masonry, at $1 75,	1,216 25
11,720	cubic yards of embankment, at 10 cents,	1,172 00
		$6,089 75
Work estimated amounts to		936 25
Amount required to complete the arch, &c.		$5,153 50

Surveys and examinations of the streams of water in the vicinity of Johnstown and Hollidaysburg, have been made in conformity to the resolutions of the board of the 20th of April and 22d of September, for the purpose of ascertaining the most favorable sites for reservoirs for supplying the Western and Juniata divisions with water.

A survey was made of the Stony creek, from the point where the levels were discontinued last fall, to a point near Stoystown, in Somerset county. Another survey was made along the valley of the Quemahoning, the largest western branch of Stony creek. Maps of these surveys accompany this report.

It will be seen by the profile on the accompanying map, that the descent of the Stony creek, is too great to admit of the forming of an extensive pool of water, without a very high dam. The stream is large, and rises at times to a very great height; during a flood, the quantity of water would be too great to be disposed of in any other way, than by allowing it to pass over the dam. If the dam were to be raised forty or fifty feet high, which would be necessary in the most favorable place, to form a pool of sufficient magnitude for a reservoir, the expense of securing it against injury by the water which would pass over it, would be very great, and it would be necessary to use wood, (which would be perishable,) in building, and securing it.

There is no very favorable site for a reservoir on the Quemahoning. It will be seen by the profile on the map, that the lower portion of the stream which was surveyed, has a good deal of descent, and the valley is not wide. The upper portion surveyed, has less descent; but the facilities for making a reservoir on this stream, are far inferior to those which are found to exist on the south fork of the Conemaugh. The streams which rise in the Allegheny mountain, and fall into Stony creek, do not drain country enough to fill a reservoir of sufficient magnitude.

There is a favorable site for an extensive reservoir above Croyl's mill, on the main branch of the Little Conemaugh; but, as the forming of one here would destroy the rail road for several miles, also the village of Jefferson, this place has not been surveyed, or taken into consideration in comparison with the other situations. The most favorable place to form a reservoir for the Western division, appears to be the one recommended in my report of Oct. 30th last, on the south fork of the Little Conemaugh, about two and a half miles above its junction with the main branch. This site has been re-surveyed this

fall, and a line traced along the sides of the hill where the proposed water-line will cut the surface of the ground. The accompanying map will show the form and size of the pool, and the depth of the water at various points. The water, when raised to the proposed height, will cover four hundred and sixty-five acres of ground, and the content will be equal to five hundred and twenty-four millions of cubic feet, This will give four thousand cubic feet per minute, for three months—a quantity amply sufficient to supply the canal, and more than twice as much as flows naturally in the channel of the riecr, below Johnstown, in the dryest seasons.

It is proposed to build the dam of embankment, and a wall of masonry, in conformity to the plan heretofore submitted. The waste water would be conveyed through a channel, to be made around the end of the dam, and pass into a ravine below it. The bed of this channel would be solid rock. No water would be permitted to pass over the dam. The sluices through which the water would be drawn from the reservoir, when required for use, should be made of cast iron, set in masonry. It is contemplated to place them in a chamber, where they would be at all times accessible, through a shaft, to descend from the top of the mound of earth and wall, so that they can be repaired and refitted at pleasure.

Estimated cost of reservoir, exclusive of pay for land and damages, &c.:

20,000	Cubic yards of	excavation, at 18 cents,	$3,600
306,000	Do. do.	embankment, at 20 cents,	61,200
13,400	Do. do.	wall, at $2 50,	33,500
Grubbing and clearing,			7,000
Making sluices,			8,000
		Total,	$113,300

The only stream in the vicinity of Hollidaysburg, upon which an extensive reservoir can conveniently be made, is the south branch of the Juniata. A survey of this has been made from the head of the present feeder to Sarah furnace, a distance of ten miles. In this distance there are two favorable sites for a reservoir : one about one and a half miles, and the other (at Seth's mill) about eight and a half miles above the head of the present feeder.

At the first mentioned point, a dam, which would raise the water twenty-five feet, would cover abeut three hundred and eighty acres of ground, and contain 229,280,000 cubic feet of water. This dam, or mound of earth, would be about two thousand five hundred feet long.

A dam at Seth's mill, which would raise the water thirty feet, would cover about two hundred and ninety acres of ground, and would contain one hundred and sixty millions of cubic feet of water. This dam will be about six hundred feet long.

The dams may consist of mounds of earth, carefully made, with a puddle ditch, carried up through the centre, raised about eight feet

above the water. The waste water should pass off through a side channel, and no part of it should pass over or fall near the dam.—This side channel may be made with little difficulty, and at a small expense, at either of the sites proposed. The gates for letting out the water should be made of cast iron, and secured in walls of masonry. They should be so arranged as to be at all times accessible, for the purpose of making repairs, or removing any obstruction. A large portion of the ground which would be covered with water, by building a dam at either of the points proposed, is now under cultivation. There are several dwelling-houses and one grist mill and saw mill on the lower site, and several dwelling-houses and a furnace on the upper site—all of which would be rendered useless by the construction of the reservoirs: the water would flow back upon the furnace about eleven feet. The south branch drains an extent of country large enough to furnish water to fill a reservoir of any desirable extent; and it is not so large as to be unmanageable during seasons of freshets.

The capacity of the reservoir nearest the head of the feeder may be doubled, by raising the dam; but it is believed that, with the height of dam proposed, it will contain water enough to supply the canal for any length of time during which dry weather can be expected to continue.

Estimated cost of reservoirs, exclusive of damages and office expenses:

Lower Site.

15,000 Cubic yards of excavation, at 15 cents,	$2,250
290,000 Do. do. embankment, at 16 cents,	46,400
Grubbing and clearing,	1,500
Sluices and masonry connected with them,	3,500
	$53,650

Upper Site, at Seth's mill.

7,000 Cubic yards of excavation, at 15 cents,	$1,050
66,000 Do. do. embankment, at 18 cents,	11,880
Grubbing and clearing,	2,000
Sluices and masonry connected with them,	3,500
	$18,430

Reservoirs on both sides of the mountain ought to be commenced without delay. On the Juniata division, very little, if any, inconvenience was experienced for the want of water during the dry part of the season of 1834; but this season the water began to fail about the first of September, and continued so low on the upper ten miles of the canal, for about two weeks, as to be a serious impediment to the navigation. From Williamsburg, eastward, the water was abundant.

On the Western division, the passage of boats was a good deal impeded, in consequence of a deficiency of water, in the latter part of August and early in September, 1834. This season the water has been more abundant, and the canal has become tighter; but still the water was low for about two weeks, though not so much so as to make it necessary to unload boats.

As the trade increases, the quantity of water required for navigation will be increased—and provision must be made for such increase, or the trade must suffer.

Beaver Division.

This canal has been in good navigable order, with but little interruption from breaches or other causes, from about the last of July, when, by the direction of the board, I first examined it, until about the twentieth of the present month. At that time, an unusually high flood injured the canal at several points, and made an extensive breach between dam No. 4 and the contiguous guard lock. I have not had time to examine this canal since the late freshet, nor the French Creek division, which has also sustained a good deal of injury. I must ask leave to defer a detailed report, relative to these canals, until I can examine them.

There are now but two assistant engineers upon the Juniata, Western, Beaver and French Creek divisions of the Pennsylvania canal. Antes Snyder, Esq. has charge, as resident engineer, of the Juniata canal, from Millerstown to Hollidaysburg, and of the Western division; and Mr. Joseph Hoops of the Beaver and French Creek divisions.

SYLVESTER WELCH, Engineer.

PORTAGE RAILWAY.

NO. 15.

Report of S. Jones, late Superintendent.

James Clarke, Esq.
President of the Canal Commissioners.

Sir—The Portage railway being so nearly completed as to render my services no longer necessary, I have retired from the situation of superintendent. In doing so, I deem it my duty to communicate to the board a statement of the transactions connected with the department, from the first of November last until this date.

During the close of the last year, all the edge rails which had arrived at Philadelphia in time to be transported to the Portage, were laid upon the railway. The two thousand three hundred and sixty-

four bars, which were noted in my last report as being at sea, did not arrive in the United States until after the closing of the canal; consequently, the completion of the second track was unavoidably delayed until the present season.

The rail road was opened on the 22d day of March, and the transportation has been carried on in the same manner as last year. On the 10th of May, however, the road was so far finished with both tracks as to justify the state in assuming the entire motive power, agreeably to the directions of the late act of the legislature. This has been done by the supervisor. Considerable difficulties were experienced at first in carrying this object into full effect; but experience and industry have overcome many obstacles, and the transit of goods is now made entirely by motive power furnished by the state.

The three locomotive engines which were reported as having been contracted for, are now on the Portage, on the long level between planes Nos. 1 and 2. Two of them are at work daily; but the third, owing to an injury done to the axle of the driving wheels, has been taken apart for repair. The locomotives in use will draw with facility, either way, sixteen cars, equal to seventy-five tons including weight of cars. They are capable, however, of propelling more than one hundred tons, but the curvatures of the road render this unadvisable. The time allowed for the passage of the engine and trains from one plane to the other, including stoppages, is one hour and twenty minutes. The two additional locomotives which were authorized to be purchased, have been contracted for at Pittsburg, and are now being constructed; and when finished will be put on the level next Johnstown.

I would respectfully suggest to the board of canal commissioners, the propriety of placing two locomotives on the level between Hollidaysburg and plane No. 10, at the earliest period practicable.

The stationary engines at the several inclined planes have continued to do their work in a very satisfactory manner, and no accidents of importance have occurred during the present season. A safety car has been projected by the principal engineer, and put in operation at the planes; it is intended to prevent the running away of the burden cars, by being placed in such a position as to intercept and check them in their descent. The stationary engines, with proper attendance, are capable of passing upwards of one thousand tons, both east and west, every day of twelve hours.

The only works of importance contemplated in the original construction of the rail road, which are unfinished, are the depots and machine shops. The rest of the contracts are generally completed.

Some difficulty occurs during a part of the summer at planes Nos. 9 and 10, in consequence of the scarcity of water; and a considerable expenditure I presume will yet have to be made to render a steady supply at those places. At the latter plane, a well has been bored to the depth of seven hundred feet without success. The water now used is brought in pipes from a neighboring spring, but the supply from this source fails in a dry season. At plane No. 9, the water is pumped from a well by the engine, but in dry weather

the quantity derived from it is inefficient. The remainder of the stationary engines are well supplied.

The following is a statement of the disbursements upon the Portage railway, since the last report. I have not thought it necessary, at this time, to go into a detail of the estimates and other information connected with the various contracts, as is usual in the annual reports, as that will only be useful, and come with more propriety from my successor, at the close of the present fiscal year:

On grading, paid			$ 19 33
Laying first track, paid for scantling,			354 68
	laying railway,		200
	engine houses and dwellings,		486 16
Second track, paid for edge rails and transportation,			51,183 35
	chairs and other castings,		25,476 72
	wedges,		2,100
	laying railway,		102,648 91½
Incidental, paid for engine houses, two setts,			10,527 12
	stationary engines, do.		12,839 63
	ropes,		7,327 53
	scales, sheds and dwellings,		2,624 95
	fencing and clearing lots at planes,		130
	coal for engines up to May 10, 1835,		3,345 66
	depots, machine shops, &c.		6,684 06
	lots for depots,		1,000
	removing buildings,		208 43
	boring wells, laying pipes, &c.		1,368 49½
	railway cars, safety cars, &c.		1,900
	making, fitting and hauling moveable rails,		2,100
	superintendent and engineer departments, &c.		8,868 33
	steam engineers, car tenders, &c.		9,260 71¼
	riggers,		1,256
	miscellaneous,		4,116 13¼
	Total,		$257 026 21
If we add to this the amount heretofore paid since the commencement of the portage,			1,444,709 40
The entire sum disbursed up to this time will be			1,701,735 61
The amount appropriated and available previous to last appropriation,		$1,580,279 41	
Amount of appropriation of 1834–'35,		146,600	
			1,726,879 41
Balance unexpended,			25,143 80
To this sum add $12,000, which was expected for locomotives out of construction fund, and afterwards refunded out of specific appropriation for engines,			12,000
The balance therefore remaining to be disbursed is			$37,143 80

Amount of appropriation for the purchase of locomotives for the Portage,	$31,500
Of this sum there has been paid	14,496 19
Leaving a sum yet to be expended, amounting to	$17,003 81

Of the sums awarded by the board, the following have been accepted and paid:

To William Hilemen,	$ 60
Thomas Croyle,	190
Isaac Hildebrand,	30
Willis Gibbory,	25
	$305

The remaining awards have been rejected, and appeals made, I presume, to the board of appraisers.

It is probable that the balance remaining of the appropriation of 1834–'35, will not meet the estimate due on the Portage; and the cause of this is, first, the expenditures incident to keeping open the railway from the opening of the season to the 10th of May, at which time the state assumed the motive power; second, the introduction of locust ties and additional chairs, &c., which were directed to be put in the roadway upon embankments to prevent lateral separation of the track; and, third, the payment of awards made by the board in pursuance of resolutions of the legislature. All the cost of these items having to be disbursed out of the construction fund, and being thus devoted to objects not taken into view at the time of making up the sum required to be appropriated, the sum necessary to meet the engagements of the commonwealth will consequently be increased beyond the estimate of the engineer, as communicated in the report made in November last.

Respectfully submitted.

S. JONES, Superintendent.

Portage Railway Office,
Hollidaysburg, June 12, 1835.

NO. 16.

Report of Wilson Knott, Superintendent.

James Clarke, Esquire,
President of the Board of Canal Commissioners.

Sir—The contracts connected with the Portage railway having been nearly all completed on the 10th of June last, at which time I

assumed the duties of the office of superintendent, the transactions connected with the same have been somewhat limited. I therefore refer the board, for a general description and detailed statement of the condition of the railway, to the accompanying report of the principal engineer, and that of the late superintendent. In the annexed tables I have thought proper to include in detail, the disbursements within the current year of the late superintendent, which will be found to correspond in amount with his report in June.

By reference to the tables, it will be found the amounts paid since the 10th of June, and the balance due on contracts completed and estimates reported final, are as follows:

	Estimated cost.	Amount paid.	Am't due.
For transporting edge rails, furnishing pins & wedges, and making, fitting, and delivering movable rails,		$7771 67	$3695 57½
Laying 2d track of railway,		11897 01	1982 05
Engine houses, 2d set,		3523 60½	1388 86½
Clearing and fencing lots at planes,		511 56	400 72
Bridge and Branch railway, Johnstown,		1410 06	
Fencing weighmaster's lot, do		167 79	
Sheds for locomotives at plane No. 2 and tunnel,		1306 82½	342 99
Water station at tunnel, railway cars and safety cars,		506 68½	
Contracts not reported final.			
2d set stationary engines,	$37,779 25		
Total paid,	28693 88	2029 25	9085 37
Depot, machine shop, Branch railway and carpenter shop at Hollidaysburg,	6950 00		
Total paid,	2395 00	1950 00	4555 00
Depot, machine shop, carpenter shop, and water station at Johnstown,	7708 00		
Total paid,	3770 00	2000 00	3938 00
Deepening well at plane No.10,	3099 00		
Paid,	2900 00		199 00
		$33,074 45½	$25,587 57
Amount paid for miscellaneous expenses,		315 60¾	
Do. and due on awards of the board, by resolution of legislature,		4793 88	8130 11
Total amount paid since 10th June last,		$38,183 94¼	$33,717 68

Leaving a sum, according to the above statement, to be provided by the legislature, amounting to $33,717 68.

But the balance of the appropriation for the Portage railway remaining unexpended on the 10th of June last, being only $29,440 22, which being deducted from $38,183 94¼, the amount paid for construction, will leave the sum of $8,743 72½ paid beyond the appropriation, for the following reasons:

The cost of the railway having exceeded the estimate, as explained in the accompanying report, the engineer, as well as no provision having been made by the Legislature to defray the expenses of opening and working the road, there has been paid out of the construction fund for,

Miscellaneous expenses connected with working the road,	$4,227 30¼
Steam engines, car, tenders, &c. at planes,	9,260 71¼
Riggers,	1,256 00
Awards of canal board per resolutions of the legislature,	5,148 56
Lot for depot at Hollidaysburg,	600 00
Superintendent and engineer department,	8,868 33
Amounting in the whole to	$29,360 90½

creating an additional deficit for the completion of the second track and its appendages: to finish which, was necessary for the offering trade. Under these circumstances, having a balance on hand of the appropriation for the purchase of locomotive engines, which was not then wanted, or even now due, for that purpose, the above sum of $8,743 72½ has been advanced out of the locomotive fund, and the second track thereby finished and put into operation. The motives governing this transaction, when properly appreciated, will, it is confidently believed, justify the course taken, as the proper vouchers, therefor, remain on hands, and will be presented to the accountant department, whenever means are provided by the Legislature for the final adjustment of claims for the completion of contracts on the Portage.

The entire sum therefore required for the payment of contracts, including the amount awarded under a resolution of the Legislature, will be $42,461 40½.

Respectfully submitted.

WILSON KNOLL,

Superintendent of Alleghany Portage Railroad.

Railway Office, Johnstown, Nov. 1, 1835.

NO. 17.

Report of S. Welch, Principal Engineer.

Engineer's Office, Johnstown, October, 30th, 1835.

To Wilson Knott, Esq.

Superintendent of the Allegheny Portage Rail Road.

Sir:—I have the honor to communicate for the information of the canal commissioners, the following report, shewing the condition of the Allegheny Portage rail road.

When the excavations required for grading the rail road were made, such slopes were given to the banks, as the character of the earth seemed to require. In loam, gravel, and common clay, the banks were cut to such a slope as to give a base of one and a half feet to every foot rise, or the inclination with the horizon was about 33⅔ degrees. Where the material removed consisted of slate and sand stone, the slopes were cut so as to give a base of about four inches to every foot rise. The line, for a large proportion of the distance, passes along the sides of hills, the slopes of which have an inclination with the horizon, of from fifteen to forty five degress. The bed of the rail road, along this portion of the distance, is cut, either altogether or in part, out of the sides of the hills. Where these are composed of rock, the slopes given to the banks were the same as those in the rock excavations in the thorough cuts, but the material excavated along the greater part of this portion of the rail road was what was denominated in the contracts, hard pan. It consisted of hard clay mixed with gravel, and generally so tenacious that a bank of the height of fifteen or twenty feet would stand, when left with a vertical face, until loosened by the action of frost. The slopes given to the banks in this hard pan excavation, were generally such as to give a base of a little more than one foot to every foot rise, or an inclination of a little less than forty five degress with the horizen. The frost and the action of the atmosphere, operates more or less every year to detach earth, &c. from the surface of these steep slopes. During the last winter the frost penetrated much deeper than at any former period since the rail road was commenced, and the quantity of material thrown down into the ditches and upon the road, during the spring rains was much greater than it had been during any previous year. The slopes on the hard pan banks are already considerably flattened, but they will probably continue to diminish in steepness until they acquire such an inclination that grass, &c. will grow upon them.

The high embankments continue to settle. During the early part of this season several of them were raised by the supervisor from one to two feet. Those which were not protected by walls when built, were formed with slopes on the sides of the same inclination as the slopes of the banks in common earth excavations. The outsides of these embankments were mostly formed of rough matetrials,

as slate, rock, &c. taken from the excavations. They have suffered very little from being washed by rains, or from other causes, except the gradual settling which depresses the slopes. In some cases additional materials have been put upon the slopes by the supervisor, and more will probably be required. The sides of the very high embankments, which were covered when they were built with slope-walls, were made with an inclination to the horizon of forty-five degrees. These embankments have retained their form since the first year remarkably well; during the first year, the settling together of the materials of which the banks were formed, where they were fifty or sixty feet high, caused the walls to crush and bulge out. At three points on the road the walls slipped partly down. One of these was built up immediately; the second one, on inclined plane No. 7, is partly rebuilt; the remaining part of it should be done as soon as it can be after the suspension of the trade and travel for the season. It will not be necessary to rebuild the wall on the level between planes 8 & 9.

The slope walls which were built along the line generally, for the support of the road embankments or for their protection from injury by the floods of the creek, are in good condition and appear to be permanent. The vertical walls built for the support of the road along the steep slopes of the hills, have not in any instance given way; they are all in good order. All the viaducts and culverts are in good order. Also the bridge on inclined plane No. 6—the only one upon the rail road. There has been no instance of any part of the regular mason work upon the rail road, yielding or giving way.

Railway Superstructure.

First track.—On the inclined planes, the railway is formed of a wood rail of either pine or white oak, six inches wide and eight inches deep, covered with a flat bar of malleable iron, two and a quarter inches wide, and five eighths of an inch deep or thick. The wood rails are notched into cross-ties of oak or pine, of the same dimensions as the rails, placed at intervals of four feet, and secured by wedges. The ends of the cross-ties rest upon a continuous bed of finely broken stone. The frame or wood part of this railway has generally kept its position, and has required but little labor to keep it in repair, except when placed upon high embankments, where it has been found necessary frequently to raise rails to preserve the regular inclination and direction of the road. Where oak rails were used, the flat bars have generally retained their places. Where pine rails were put in, there has been more difficulty in keeping the iron from getting loose. The iron plate rail bends under the car wheel as it passes along, and, the pine wood being soft, yields to the pressure of the load, when the car has passed over the depressed point, the rail springs up to its original position. The continual working up and down of the iron draws the spikes, and the rail, or a portion of it becomes loose. These loose rails require a good deal of care and attention on the part of the workmen who are employed to keep the road in repair, to prevent the occurrence of accidents.

When these rails are renewed, I would recommend the use of white oak, seasoned at least one year, in preference to any other timber that can be obtained in the vicinity of the road. Locust would be preferable, but it cannot be procured in pieces sufficiently long for the purpose.

The rails on the level parts of the road were laid partly on stone blocks, and partly on a timber foundation. Where stone blocks were used, the bottom of the mass of broken stone upon which they are placed is two feet below the surface of the rail road. Covered drains were made to convey all the water from the broken stone and other parts of the foundation, so that frost must penetrate more than two feet before it can affect the railway. During the winter of 1833 and 1834, the frost affected the road but little, and the expense of adjusting the rails in the spring, and of keeping the railway in repair during the season, was comparatively small. Last winter the frost penetrated far below the foundation, raised the railway and produced derangement to an extent that required a large amount of labor and expense to put it in a condition for use, and to keep it so during the spring months. When the frost left the ground in the spring, the outsides of the road bed became soft, before the middle part was affected by the warm weather, and the outside line of blocks in each track settled, while the inside lines maintained their position in the frozen ground. This caused the two lines of rail which form each track to seperate so much, that it was deemed necessary to put in locust cross-ties between the stone blocks to bind the two lines of rail together. This has been done on both the first and second tracks to a considerable extent.

The part of the first track which was laid with a timber foundation, has kept its position and required but little repair, except on the high embankments where it has been raised from time to time to preserve the grade. Where the frost raised this kind of railway, the cross-ties which are used as a substitute for stone blocks, prevented the lateral seperation of the rails.

Second track.—The whole of the second track is laid upon stone blocks. In the curves, where the radius of curvature is less than ten hundred and fifty feet, every third block extends across the track and connects the two lines of rail which form it. The portion of the railway thus connected, has not separated or spread; but where the blocks were laid last season, or during the winter, their horizontal position was very much deranged by the frost and the settling of the embankments. In the curves of larger radius, and the straight lines, the track was laid without connecting the two lines of rail either by long blocks or ties of wood: but, in consequence of the great derangement produced by frost, and the settling of the railway irregularly in the spring, it was deemed advisable to put locust ties between the stone blocks, on a considerable portion of this track. A part of the ties were furnished and put in by the contractors for laying the railway,—a part by the supervisor since the contracts were completed, and a portion of them still remain to be put in. A sufficient number have been purchased by the supervisor, and they are delivered upon

the rail-road. If chairs and spikes are provided in due season, all the remaining cross-ties can be put in this fall. These ties are put in at intervals of six feet. They are not intended to support the rails, as the stone blocks perform that office, but merely to prevent them from separating or pressing outwards.

Stationary steam engines.—There are two stationary engines at each inclined plane—one on each side of the machinery. One of these was put up during the fall and winter of 1833. The second set of engines were built, or put up, during the present year. They are all completed. The old engines at inclined planes Nos. 6, 7 and 8, each require an additional boiler. This addition will give the first and second engines at these planes, the same working power. The arrangement of the engines is such, that the power of one, or both, may be applied to the machinery at the same time. Thus far, only one has been used at a time, and I am of opinion that the use of one at a time, will be all that will be requisite for the transit of all the trade that the two tracks on the planes can accommodate. They should each be worked a portion of the time, and both should always be kept in readiness for use. If any derangement takes place in one, the other can be in readiness to work, and the business of the road will be suspended only while the engine-man is changing his fire from one engine to another.

All the engines have required more or less repair. At inclined planes Nos. 2, 3, and 6, parts of the boilers have been made new.—They were injured in consequence of the inattention of the engine-men. Generally the repairs have been inconsiderable, and have been principally made by the engine-men and their assistants. The machine shops belonging to the railroad are of great advantage in repairing the stationary as well as the locomotive engines. Any part of an engine that may break or get out of order can now be renewed or repaired in a short time: before the commonwealth's shops were in order to do work, it was necessary to send to Pittsburg for every new piece required to repair an engine.

The dwelling houses for engine-men and assistants at the inclined planes are in good condition. Each house has half an acre of ground enclosed for a garden, yard, &c. Some of these enclosures are so covered with rocks, or the surface is so much inclined, being on the steep slopes of the mountain, that they are of little use to the occupant. Others can be cultivated with advantage.

Supply of Water for stationary Engines.—At inclined planes Nos. 1 and 2, the water for the engines is taken from small spring runs and conveyed in wooden pipes to the cisterns—the line of pipes at plane No. 1 is 533 feet long: at plane No. 2, it is 4079 feet long: they are in good order, and the supply of water is abundant. At inclined planes Nos. 3, 4, 5, and 6, the engines are supplied from wells bored into the ground about two hundred feet. They are about four inches in diameter. These wells furnish a sufficient supply of water, except occasionally when the pumps get out of order. At planes Nos. 7 and 8 the water for the engines is taken from Blair's Gap

run, and conveyed in wood pipes to the engine. The line of pipes at No. 7 is 1116 feet long: at No. 8, it is 4530 feet long. At inclined plane No. 9, the engine is supplied with water from a well, a little more than two hundred feet deep. In the dry part of the season the water partially fails, and the deficiency has been made up by water carried from a distance in cars. At plane No. 10, a well has been bored a little more than 700 feet deep, without obtaining water. While this well was in progress, wooden pipes were laid to a spring a short distance from the road, with a view to procure a temporary supply of water. This failed in the dry part of the season. When the plan of procuring water by boring failed, the only means of obtaining it, was to lay a line of pipes from Millstone run to intersect the line of pipes which conveyed the water from the spring. This was done during the summer by the supervisor. There is an abundant and permanent supply of water. The line of pipes is 9550 feet long.

Weigh-scales, &c.—The weigh-scales at Johnstown and Hollidaysburg are in good order. A train of four cars, gross weight from 18 to 20 tons, are weighed at one time. The time consumed in weighing them is from three to four minutes. The dwelling houses in which the weigh-masters live require no repairs. Each has a lot of ground enclosed for a garden.

Depots and Machine Shops.—The depot and machine shop and the water station at Johnstown are nearly finished. The side railway, bridge, turnouts, and turnrounds, are completed and in use. A part of the materials are delivered for the carpenters' shop. The locomotive engine shed and water station at the north end of the tunnel, and the locomotive engine shed and water station at the foot of inclined plane No. 2, are completed, and final estimates have been reported to the superintendent. The blacksmith's shop at the summit near inclined plane No. 5, is finished and in use. The depot, machine shop, and carpenter's shop at Hollidaysburg, have their foundations carried up to the level of the railway, and the embankments for the side railway and yard of the machine shop are partly made. The further progress of this work, as also that at the depot at Johnstown, was suspended for want of funds.

A master workman for the machine shop at Johnstown, and one for the blacksmith's shop at the summit, were appointed about the first of June, and the shops were soon after furnished with workmen. The work done consists of making tools for the use of the shops, repairing stationary engines, altering and repairing locomotive engines, making spikes and other iron work for the repair of the railway, and some work for the repair of the canal.

These shops have already been of material service in making repairs to the stationary as well as the locomotive engines. Before the public shops were ready for use, the supervisor was obliged to send to Pittsburg for all the heavy iron work required for the engines, machinery, or any part of the railway, as the common shops in the neighborhood were not provided with the requisite tools, machinery,

and workmen necessary to do work for such a purpose. With regard to the locomotive engines, they could not be kept in operation any length of time without a machine shop, as they require repair more or less, every week or two, which could not be done in an ordinary shop by common workmen.

The steam engines and lathes for the machine shops, have not been, furnished except one small lathe for the shop at Johnstown. The superintendent has made arrangements for the purchase of one small engine and one large lathe for the shop at Johnstown, but they are not yet built; and as there are no funds to pay for them, the order will be suspended. The tools, lathe, &c. purchased for the shops, thus far, have been paid for, principally, out of the motive power fund, as the appropriation for construction, which included an allowance for engines, tools, &c. for the machine shops, had been expended, or nearly so, before these articles were required.

Rigger's Loft.—The rigger's loft requires no repairs. A piece of ground around this building and the smith's shop should have the timber cleared, and be enclosed. A small rope walk, for the purpose of making the small ropes used about the inclined planes, &c., should be attached to the rigger's loft.

Cost of the rail road.—The following statement of the cost of the rail road, includes all work done and materials purchased under contracts entered into by the superintendent, and all rails, &c. purchased by bill, and used in the construction of the rail road.

Office expenses, officers' pay, amount paid for land purchased for house lots, shops, &c., repairs paid for by superintendent, and the expense of working the rail road prior to the tenth of May last, are not included.

Aggregate cost of grading, and work done under contracts for grading—see details in former reports,		$472,162 59¼
Aggregate cost of masonry—see details in former reports—Viaducts,	$79,755 80½	
Bridge,	2,327 44	
Culverts,	34,319 39¾	
		116,402 64¼

Aggregate Cost of Railway Superstructure.

Aggregate cost of work done and materials furnished under contracts for the first track—see details in former reports,	$430,716 59½	
Aggregate cost of work done and materials furnished under contracts for laying the second track—see table No. 3,	186,226 85	
Cost of edge rails delivered in Philadelphia,	87,494 80	
Cost of plate rails delivered in Philadelphia,	2,165 95	
Cost of transporting edge and plate rails from Philadelphia to the rail road—see table No. 2,	31,642 20½	

Cost of chairs and other castings for the second track—see table No. 2,	41,967 29		
Estimated cost of pins,	5,505 17		
Do. wedges,	5,649 12		
Cost of making irons and fitting moveable rails, and transporting them to and from the shops,	2,335 67		
Aggregate cost of work done and materials furnished under contracts for building stationary engines and machinery, houses, sheds, dwelling-houses for engine men, &c., wells and water pipes, including first set of ropes—see details in former reports,	151,923 30¼		
Estimated cost of second set of engines, see table No. 5,	37,779 25		
Cost of houses, walls, &c., for second set of engines—see table No. 4,	21,049 59		
Estimated cost of work done under contracts of superintendent for boring wells, &c., since the 1st Nov. last,	1,469 00		
Cost of fencing lots at the inclined planes, see table No. 6,	1,568 78		
		1,007,493 57¼	
Cost of weigh-scales and sheds, weigh-masters' houses, fencing lots, rigger's loft, tubes and rods for wells at engine houses, and bolts for engine walls—see table No. 1 and former reports,		9,842 78	
Estimated cost of depots, machine shops and water stations—see table No. 1,		26,281 27½	
Cost of building and removing fence along the rail road, removing buildings, &c.—see details in former reports,		2,174 83	
		$1,634,357 69¾	

In my report of the thirtieth of October last, the cost of the rail road, exclusive of the miscellaneous expenses, was estimated at $1,611,545 87½. The cost of the road is found to exceed the estimate of last year by $22,811 82. The expense of laying the second track, has exceeded the estimate of last year, as appears from the detailed account, $16,292 62. The contractors for laying the second track put in nearly all the new crossings, and removed the temporary ones, which were put in with the first track. The expense of doing this work, which amounts to about four thousand dollars, is included in the final estimates of the different sections: but the amount provided in the estimate of last fall to pay for it, is included in the eight thousand dollars put down under the head of contingencies, and intended to pay for fitting and putting in crossings, &c. The locust and pine cross-ties, purchased by the con-

tractors, and put into the road as far as chairs could be procured to put them in, amount to about eight thousand dollars. No provision was made for putting in these ties, in the estimate of last fall, as they were not then deemed necessary. The cost of several of the sections was increased by the labor required to raise the road where embankments had settled, and to adjust it where it had been deranged by frost. The expense of this labor, when done by the contractors, is included in the final estimates.

The expense of chairs, and other castings, exceeds the amount allowed in the estimate of last fall for that purpose, about nine thousand dollars. That estimate included the cost of the chairs required to complete the track, and an allowance for castings for the new crossings. The putting in of the cross-ties required a large addition to the number of chairs, and the castings for crossings and other purposes cost considerably more than was expected. For the chairs, purchased for the cross-ties, the superintendent paid about five thousand dollars; for other castings, about four thousand dollars more than was provided for.

The expense of fitting and hauling the moveable rails, was included in the estimate of last fall, in the item of eight thousand dollars, above referred to.

The expense of the engine houses and walls, has exceeded the estimate of last year a little more than three thousand dollars. This increased expense was occasioned principally by the greater quantity of excavation of rock at plane No. 3, and the increased depth to which it was necessary to dig to obtain foundations for the walls, and the consequent increase of masonry, particularly at planes Nos. 1, 7 and 8.

The cost of repairing the railway, this season, considerably exceeded the expense of last year. A part of the work done, and a portion of the materials furnished, may be regarded as extraordinary repairs. On section No. 9, a piece of the road which lies along the face of a steep hill, settled down, in consequence of the whole face of the hill sliding. The excavation and wall required to secure this slip, cost about two thousand dollars. The locust ties, the chairs, pins and wedges, which have been provided for putting into the first track, and portions of the second, to prevent the rails from spreading, do not belong to ordinary repairs. The amount paid for these, exclusive of the cost of putting them in, is about twelve thousand two hundred and eighty-three dollars. About fifty tons more of chairs, and a corresponding number of spikes and wedges, will be required to put in the remainder of the ties now on hand, and to supply the places of broken chairs along the line.

As soon as the transportation is suspended for the season, two additional crossings should be put in from one track to the other, at the head and foot of each inclined plane, except at the foot of plane No. 1 and at the foot of plane No. 10. These crossings have become necessary to facilitate the passing of trains of cars by one another, particularly passenger cars, which are increasing on the rail road. New castings will be required for these; and some of the plates and

chairs in the crossings, that were put down last spring, will require to be recast, as they are already a good deal worn. The new crossings will require seven hundred flat bars of railway iron, of the same dimensions as the bars in use on the rail road. The seven hundred flat bars will weigh a little more than twenty-two and a half tons.

There is now but one assistant engineer, Mr. Solomon W. Roberts, upon the rail road. This young gentleman has been employed as principal assistant during the whole progress of the work, and has had charge, as resident engineer, of laying the second track.—The services rendered by him, and his brother assistants, Messrs. William Milnor Roberts and Edward Miller, who resigned their situations on the completion of the divisions of the work of which they had the direction, have been highly useful to me, and beneficial to the public interest.

The rail road is now in good order. All the contracts for work, and furnishing materials for the railway and its fixtures, are completed, except the depots and water stations at the ends of the road. The final estimates for the balance of the contracts are ready to be presented, as soon as funds shall be provided for paying them.

Respectfully submitted,

SYLVESTER WELCH, Engineer.

NO. 18.

Report of S. Welch, Principal Engineer, upon Motive Power.

Engineer's Office, Johnstown, Oct. 31st, 1835.

To James Clarke, Esq.
President of the Board of Canal Commissioners.

Sir—I have the honor to submit, for the information of the canal commissioners, the following report, on the subject of the transportation and motive power upon the Allegheny Portage rail road.

The first track of the rail road was opened for transportation on the 18th day of March, 1834, and continued in use until the 31st day of December. The expenses incurred in keeping the inclined planes in operation, including the expenses of riggers, ropes, &c. were paid by the superintendent, out of funds appropriated to pay for constructing the rail road. This amounted, from the 18th of March, to the 31st of Oct. 1834, to about thirty thousand dollars—and from the 1st day of Nov. 1834, to the 10th day of May, 1835, to about eighteen thousand five hundred dollars, making forty eight thousand five hundred dollars. This amount does not include the cost of safety

cars, and sundry articles purchased for the planes which were only partly worn, or perhaps not, at that time, put to use. It includes the cost of labor paid for materials consumed, and the proportion of the value of such as were partly consumed or worn.

Individuals engaged in transportation, furnished their own horses to haul cars over the level parts of the railway. The horses, except those of the Western Transportation company, travelled over the whole road and consequently, passed up and down all the inclined planes. The horses of the Western Transportation company, were divided into three relays: these also passed up and down the planes. The average amount paid by the transporter, for horse power to convey a ton of freight over the rail road, was about $1 12½ cents.

The number of tons of freight transported on the rail road, from the 18th of March, to the 31st of Oct. 1834, was equal to about twenty-four thousand, carried over its whole length. And the number of tons transported from the 1st of Nov. 1834, to the 10th of May, 1835, amounts to about sixteen thousand—making, together, forty thousand tons. In this estimate of tonnage, the passengers are not included.

During the time embraced in the above computation of the expense of working the stationary engines, about the one fiftieth part of the labor performed by them, was applied to the cars which conveyed passengers. The estimated expense of the engines, which is $48,500, divided by 50, gives $970, which deducted from the $48, 500 leaves $47,530, to be charged to the common freight: $47,530 divided by 40,000, (the number of tons of freight) equals $1 19. This added to the average cost of the horse power, viz: $1 12½, makes $2 31½ as the expense of motive power for transporting a ton of freight over the rail road, while it was used as a public highway.

Contracts were entered into about the middle of August, 1834, by the superintendent, in compliance with an order of the canal commissioners, by resolution dated April 22d, 1834, for three locomotive engines—one to be built by the Mill Dam Foundry company, of Boston, Massachusetts, and two by Edward A. G. Young, of Newcastle, Delaware. The first of these was to have been delivered at Boston, on or before the 20th, of Oct. then next ensuing; and the two last, were to have been delivered on the wharf in the city of Philadelphia, on or before the 15th of Nov. The Mill Dam Foundry company, delivered their engine in due season: but the engines built at Newcastle, were not furnished until sometime in March, 1835.

The superintendent subsequently made a contract with Messrs. M'Clurg, Wade, & Co. of Pittsburg, to build two locomotive engines of the same kind and description as the one built by the Mill Dam Foundary company, which was to be sent to Pittsburg, at the expense of Messrs. M'Clurg, Wade, & Co., to be used during the winter, as a working model. These engines were to have been finished and put upon the road early in the season, but owing to the difficulty of obtaining some part of the materials, and procuring me-

chanics who understood that particular kind of work, the first engine was not put upon the road until the first of September, and the second one is not yet quite finished.

Arrangements were made during the winter to open the road on the first of March, provided the canals were open and the trade should require it. The weather continued cold until the middle of the month, and the slack-water on the upper portions of the Juniata and Conemaugh rivers was covered with ice, so much as to obstruct the passage of boats, until about the 18th of March.

Persons engaged in the business of transportation, uncertain as to the course which the legislature would pursue in relation to motive power, and in expectation that the road would be open about the 1st of March, made temporary provision for hauling their own cars, until some definite arrangement should be made. This was done by the act of assembly of the 27th of February. By this act the canal commissioners were required to "contract with individuals, or associations of individuals, for the supply of such horses or other beasts of draught, drivers and attendents, as may be found necessary or useful for transporting persons or merchandise across the Allegheny Portage, on such levels of the railway where, in their opinion, the use of animal power is required or expedient."

It required some time after the passage of this act for the agents of the state to make arrangements for putting on the motive power. It was expected that the three locomotive engines, with which it was intended to do the work on the level between planes Nos. 1 and 2, would be set upon the road and ready for use by the 10th or 15th of April: and as the transporters, or most of them, had already provided horses for themselves, it was deemed advisable to allow them to use their horses, and to be governed by the regulations of last season, until the locomotive engines could be made ready for use.

The engine which was sent to Pittsburg, was returned to Johnstown about the 28th of March. The engines made at Newcastle reached Hollidaysburg about the 15th of April. They were brought to Johnstown and fitted up as expeditiously as the means at command would permit. There was then no workshop in operation, and all the fixtures required in fitting the machinery together, and all necessary alterations of the parts of the work, were done in a common blacksmith's shop.

The supervisor advertised on the 5th of March, for horses to work upon all the levels of the rail road except that between planes Nos. 1 and 2. When the contracts were awarded he gave notice to those contractors who resided at a distance, to have their horses in readiness on the 1st of May, when it was expected the locomotive engines would be ready to perform their regular work.

After various trials it was believed that the locomotives were in a condition to perform regular service, and the supervisor directed the contractors, who had not had previous notice, to put the horses and drivers, which they had agreed to furnish, upon the road on the 10th of May; and the transporters were informed that the commonwealth would furnish all the motive power from and after that day.

The level upon which the locomotive engines work, is thirteen miles long. On four miles of this the inclination is twenty one feet in a mile—the whole ascent is 190 feet. It was intended that each engine should make either two or three trips a day, to be governed by the amount of trade and travel. Two trips would require each engine to travel fifty two miles per day, and three trips seventy eight miles per day.

The load for each engine when ascending the grade is twelve loaded cars, the weight of which, including cars, is about 120,000 lbs. or 60 tons. In descending the grade, each engine draws any number of cars not exceeding twenty four. In one or two instances they have drawn thirty three. They are allowed to run, when under weigh, at the rate of ten miles per hour.

The engine built by the Mill Dam Foundry company, called the Boston, has performed its regular trips from the 10th of May to the present time, with the loss of but two half days. It has generally made two trips a day, or travelled fifty two miles. The whole expense of repairs, from the 10th of May to the 30th of October, has been seventeen dollars, exclusive of those made by the engineer, which added no expense. This engine, during the greatest part of the season, in connection with its other work, has hauled the passenger cars in both directions each day. This detained it—otherwise it might have made three trips a day for the greatest part of the time. It weighs, without its water and fuel, $8\frac{1}{2}$ tons. The cost of the engine, without the tender, delivered on the wharf at Boston, was $6,996 75. The cost of transporting it to the rail road, including $41 25 paid for alterations at Pittsburg, was $223 25. This engine performs the labor, every day, of eighteen horses, and it might easily do one third more, if it were not necessary to reserve it for the transportation of passengers. The daily expense of running it is seven dollars and twelve and a half cents, exclusive of repairs.

When the engines built by Mr. Young, of Newcastle, were put upon the road, they appeared to have capacity for performing more effective service than the Boston engine. The boilers were larger and would generate more steam. The machinery was arranged differently from that of most other engines built upon the same general plan. It was apparently more simple, but less substantial. The builder had had several years experience in the use of locomotive engines, and it was expected that the deviations made by him from the general plan, and from the engine designated in the contract as the model, according to which he was to build those for the Portage rail road, would be an improvement, inasmuch as that they were to be put up and tried upon the rail road by persons furnished by the builder, and approved of by the engineer, before they were finally paid for.

At first they performed as well as new engines could be expected to, but after a few days they began to exhibit defects which required labor and expense to remedy. The crank-anxle of the one called the Delaware, failed, when it had run about four days. The builder was immediately apprised of this, and promised to furnish a new

axle as soon as possible. It reached the rail road about the 1st of September, and was fitted into the engine, which is now at work, but which has not yet been taken off the contractor's hands. The other engine, called the *Allegheny*, after a good deal of refitting, was made to perform its regular work, which it continued to do for a little more than two weeks, when the crank-axle broke, which will render it useless until a new one can be made. This engine was regarded as finished and tried, and was taken off the contractor's hands. The new axle must therefore be paid for by the commonwealth.

The contract price for the locomotive engines, built by Mr. Young, is eleven thousand dollars, or five thousand five hundred dollars each. They were to be delivered on the wharf in Philadelphia at the expense of the builder. The expense of transporting them from Philadelphia to the rail road was $316 00.

The engine built by Messrs. McClurg, Wade & Co. at the Penn foundry, called the *Pittsburg*, was put upon the railroad on the 3d day of September. After running it for a short time to wear the working parts smooth, it was put into the line, where it has performed its work with unusual regularity for a new engine. It is constructed in all respects like the locomotive *Boston*, and, from present appearances, it will prove to be equally good. The other engine which Messrs. McClurg, Wade & Co. are building, and which will be finished in a few weeks, will have greater working power than the *Pittsburg*, and promises to be a superior piece of work.

The contract price for these engines is $4,500 for the first—and $4000 for the second, and the contractors are bound to put them up on the rail road, and run them until the principal engineer shall be satisfied with their performance, and accept them. This is but little more than two-thirds of what would be charged at other manufactories in this country. It is presumed that in making the offer to build them at this reduced price, the advantages that would accrue from having a superior working model, which the commonwealth furnished, were taken into consideration.

Of the five engines above described, it was designed that three should work upon the level between planes Nos. 1 and 2, and that two should be kept upon the level between Johnstown and plane No. 1. Of the last, one only would work at a time. On the other level two would always be at work, and the third would run when the others made but two trips a day. An engine can be transferred from one level to the other in about fifteen minutes. The spare engines are therefore available for both levels.

Amount paid for Motive Power by the Transporters.—The charges for motive power paid by the transporters to the collectors have been as follows: the distance charged for is thirty-six miles.

For each car, two cents per mile, or	$0 72
ton of freight, two cents per mile, or	72
each passenger, one cent per mile, or	36

The maximum load to be carried on a car is three and a half tons. When loaded with coal or iron, they generally carry nearly or quite

that quantity; but, when loaded with merchandise or common produce, they carry from three to three and a quarter tons.

If a car passes in both directions over the rail road, loaded with three tons, the expense of motive power will be,

Motive power, toll on car, 36 miles, at two cents,		$0 72
Do.	three tons of freight, 36 miles, at two cents,	2 16
		$2 88

Two dollars and eighty-eight cents divided by three, equals ninety-six cents, the cost of each ton.

If the car is loaded in only one direction, the expense of motive power will be,

Motive power, toll on car, 36 miles, at two cents,		$0 72
Do.	three tons of freight, at two cents,	2 16
Do.	car returning, at two cents,	72
		$3 60

Three dollars and sixty cents divided by three, equals one dollar and twenty cents for each ton.

The number of passenger cars that have passed over the rail road will average about six on each day, three each way, and the number of persons who travelled in passenger cars will average about eleven to each car.

Motive power, toll on car, 36 miles, at two cents,		$0 72
Do.	eleven passengers, at one cent for each passenger per mile,	3 96
		$4 68

Four dollars and sixty-eight cents divided by eleven, equals forty-two and a half cents for each passenger carried by passenger cars.

The number of tons of freight cleared at the collectors' offices for the rail road, during the fiscal year, appears to be 53,360. A part of this was way loading, which, if averaged for the whole distance, would reduce the quantity to about 50,000 tons. Of this about 16,000 tons passed over between the first of November, 1834, and the 10th of May, 1835. The remaining 34,000 tons passed from the 11th of May to the 31st of October. About 11,000 tons of this was carried eastward, and 23,000 tons westward.

The amount received for motive power tolls by the collectors, from May 11th to October 31st, was

At Johnstown,	$15,148 10	
Hollidaysburg, (a few of the last days estimated,)	24,067 76	
Motive power toll for freight and passengers,		$39,215 86

Motive Power toll received on Passengers.

Johnstown, principally going east,	1,499 16		
Hollidaysburg, do. west,	3,225 52		
		4,724	68
otive power toll received for freight,		$34,491	18

pense to the Commonwealth of the Motive Power, from the 11th of May to the 31st of October.

Stationary steam engines—average cost:

e engineer of machinery, at $1 68½ per day, 174 days,		$293	19
e assistant, at 1 00 do.		174	00
e fireman, at 87½ do.		152	25
vo men at the foot of the plane, at 75 cents per day, 348 days,		261	00
al, 41 bushels per day, 174 days, equal 7134 bushels, average price 4¼ cents per bushel,		303	19
ty-three gallons of oil, at $1 25 per gallon,		66	25
ear and tear of rope,		850	00
idental expenses, including tar, tallow, &c.		110	00
		2209	88
ultiplied by ten inclined planes,			10
		$22,098	80

Rigger and Assistants.

ie rigger, 174 days, at $2 00 per day,		$348	00
ree assistants, 174 days each, at 1 12½ "		587	25
idental expenses for rigger's loft, and extra hands,		195	25
		$1130	50

Horses and drivers employed under contracts on the short levels. The following table shows the length of each level—distance traved by each horse—number of horses allowed for each train of four aded cars—gross weight of four loaded cars—average number of rses employed during the season on each level—power which each rse is required to exert in ascending the grade, in pounds—power hich a horse is required to exert in descending the grade, in pounds -average power exerted by a horse when loaded in both directions -mean grade, distance in which the road rises one foot.

TABLE.

Levels on which horses are used.	Length of each level.	Distance travell'd by each horse per day.	Number of horses for a train of four cars.	Gross weight of four loaded cars.	Average number of horses this season on each level.	Power exerted by each horse in ascending the grade, in pounds.	Power exerted by each horse in descending the grade, in pounds.	Average exertion by each horse, if loaded in both directions.	Mean grade distance in which the road rises one foot.
From Johnstown to plane No. 1,	4 miles.	20 ms.	3	40,000	24	133 1/3	0	66 2/3	200
Long level,	13 miles.								
From plane No. 2 to 3,	1 6/10 miles.	22 4/10	2	40,000	6	140	60	100	500
Between planes 3 and 4,	1 9/10 miles.	26 6/10	2	40,000	7	140	60	100	500
Between planes 4 and 5,	2 1/2 miles.	20	2	40,000	11	140	60	100	500
Between planes 5 and 6,	1 1/2 miles.	21	2	40,000	7	148	52	100	417
Between planes 6 and 7,	16/100	6 3/4	1	40,000	1	200	200	200	Infinite
Between planes 7 and 8,	63/100	20 16/100	2	40,000	4	140	60	100	500
Between planes 8 and 9,	1 1/4 miles.	22 1/2	2	40,000	6	140	60	100	500
Between planes 9 and 10,	1 3/4 miles.	21	3	40,000	9	112	21	66 1/3	294
From plane No. 10 to Hollidaysburg,	3 miles.	21	4	40,000	24	137	0	68 1/2	115
						Sum		1001/2	

e aggregate length of the levels worked by horses employed
contracts, is $18\frac{3}{4}$ miles—the average number of horses so em-
d during the season, has been 95; number of drivers 36; average
of horses $76\frac{2}{10}$ cents, average price of drivers $74\frac{3}{4}$ cents—ag-
te expense of horses and drivers employed under contracts
22 $88\frac{1}{2}$. See details in table marked H.

the plan submitted in my report of the 31st of October last, for
rangement of motive power on the rail road, it was contemplat-
do the work on the level between the Johnstown basin and
No. 1, with locomotive engines. Engines for the purpose
engaged, which it was believed would be finished early in the
n, and this expectation was entertained when the charge for
e power was established. This level has been worked by
s at an expense exceeding ninety per cent. more than it would
eost to have performed the same labor with good locomotive
es. Some of the other levels have required a few more horses
was contemplated, and the price has been somewhat higher than
tated in my report of last year.

nse of Motive Power, on the level between Planes Nos. 1 and 2.

the 10th of May, when the commonwealth commenced to fur-
he motive power, there were three locomotive engines upon this
which were believed to be in order for use. These engines, it
upposed, would do all the work necessary to transport 250 tons
way, every day, and two of them could have done all the work
e event of one getting out of order. A few horses were employ-
work by the day, when the engines were first started, in order
ard against an interruption to the trade in the event of any acci-
to the engines; but it was expected that these would be required
or a short time. One of the engines has performed its regular
so far as its connection with the travel would permit. The
s, in consequence of material defects in their construction,
h could only be determined by use, have been out of order, or
n a condition to run, for a considerable part of the time, and
they were at work the uncertainty of their continuing to do so,
it necessary, a part of the time, to keep horses in readiness, to
nt an interruption to the regular business of the road. The
s employed upon this level travelled twenty six miles a day,
h, with a full load, is five miles more than a regular day's work.
were hired by the day, of sundry individuals, and their num-
was increased or diminished in proportion as the bad engines
l be made to do more or less work. By this arrangement the
and travel sustained no interruption.

xpense of running the Boston locomotive engine 174 days—
ge distance travelled each day 52 miles—rate of travelling ten
s per hour.

Engine-man,	174 days, at	$2 00	per day.
Fireman,	174 do.	1 12½	do.
Coke and wood,	174 do.	2 50	do.
Oil,	174 do.	1 00	do.
Tallow, hemp, lead, &c. &c.		50	do.
		$7 12½	do.

$7 12½ multiplied by 174 days, equals	$1,239
Repairs during the 174 days,	17
	$1,256

174 days multiplied by 52 miles, equals 9048 miles: 9,048 m
divided into 1,256 75, gives 13 cents 9 mills per mile—the expe
of running the engine.

This result is more favorable than could be expected from an a
rage of a number of engines. The cost of repairs in this case is v
small, and the engine has lost no time. The two half days tha
was idle, were compensated by additional trips on other days. T
engineer who run it was an experienced and careful man, and as
engine performed but a moderate day's work, ample time was gi
to examine it, every trip, and put every thing in order. The s
rate of travelling is greatly in favor of the durability of engines,
well as of the cars, and I am of opinion that they ought not to
permitted, when drawing freight cars, to travel at any time more t
ten miles an hour.

The expenses of the Allegheny and Delaware have been, in
days, exclusive of that portion of the repairs and alterations wh
are to be charged to the builder, $1,950 00.

The engine-men have been employed during the number of d
stated in the table marked A.

When the engines were not running, the men were at work at
pairing them. One of them, the Delaware, is now upon the ro
doing its regular work.

The Pittsburg has been upon the road 52 days. It runs in
place of the Allegheny, which is not in working order.

The expense of the Pittsburg during the 52 days is, including
pairs, $385 50.

The expense of horses employed upon this level, from the 11th
May to 31st of Oct. is, (for details see table marked I,) $5,319 25

Foremen at depot at each end of the level, $348.

Aggregate expense of working the level between planes Nos
and 2, $9,259 50.

Aggregate expense of motive power, from the 11th of May to t
31st of Oct. both inclusive.

Inclined planes, including wear and tear of ropes, &c.	$22,098 8
Rigger and assistants, &c.	1,130 5
Horses and drivers, employed under contracts on the short levels—aggregate length 18¾ miles,	17,222 8

Level worked by locomotive engines and horses—length 13 miles, .	9,259 50
Expenses of machine and smithshops, not included in the above,	1,966 04
	$51,677 72½
Amount of motive power received,	39,215 86
Excess of expenses over receipts,	$12,461 86½

The expense of working the levels between Johnstown and plane No. 1, and between planes No. 1 & 2, has been increased about six thousand dollars, by using horses instead of locomotive engines, which were contemplated when the estimate of the cost of motive power was made.

The quantity of freight passing eastward, has been much less than was expected when the rates of charge for motive were fixed. Cars during a considerable part of the season, have passed eastward with but little freight, and for the last two months, they have been almost altogether empty. This has diminished the receipts for motive power, without diminishing the expense, as the full number of horses must be kept upon the road to haul the loaded cars in one direction. The irregularity of the trade also makes the motive power a good deal more expensive. For a few days, from seventy to ninety cars will pass in each direction on each day. On the next week the number may not exceed forty or fifty. Sometimes there will be eighty cars running each way on one day, and the next day, not more than forty. Horses enough to haul the gratest number must always be kept upon the levels. The expenses at the inclined planes will be very nearly the same, whether the amount of freight transported be fifty or one hundred thousand tons. The same number of men will be required, and the quantity of fuel and the expense of ropes will be very nearly the same.

The addition of any number of tons to be transported, would require but a small proportional increase of expense in the motive power. Whatever increase might be required would be for horses and locomotive engines. The trade, as it increases, will become more regular, and the quantity of surplus power required will be proportionally less.

It will be perceived that the amount above stated, as the cost of motive power, does not correspond with the amount reported by the supervisor. In his statement, he has included the articles purchased, and labor done, for which he has paid money or made contracts, whether for the hire of horses and drivers, pay of engine-men and assistants—repairs of engines, both locomotive and stationary—purchase of tools, iron &c. and pay of workmen for machine shops, and all other things which, by direction of the auditor general, have been charged to the motive power fund. In the above statement, the actual cost of labor done and materials consumed, where that could be ascertained, as the expense of horses, men, fuel, repairs of engines, &c. during the time included—and the estimated proportion of the

wear of ropes. and such other things as are not worn out or consumed, have been taken as the cost of motive power for the 174 days.

Seven new ropes have been ordered to be made and delivered before the close of the navigation of the canal. These, with the ropes on hand, will be sufficient to put the rail way in operation next spring, and it is believed that with the addition of one new rope, they will last during the next season. These ropes will cost about $12,000, and the rail road cannot be opened and worked with security next spring, without them.

The expenses which will be incurred from the present time to the 10th of March, when in the ordinary course of things the rail way will be opened for use, are estimated at $18,966, supposing the transportation to be suspended on the 25th of December. The receipts for motive power will depend on the amount of trade. It will not equal the expenses, as a part of December, January, February, and a part of March, during which time some repairs will be required both to the stationary and locomotive engines, and also to the machinery at the stationary engines will produce no receipts.

Two new locomotive engines will be required next season on the two levels next to Johnstown, in addition to the five now on the road and building. These engines, with tenders, will cost, delivered on the road, six thousand five hundred dollars each, making thirteen thousand dollars. Two locomotive engines, of the heaviest kind, should be purchased for the level between Hollidaysburg and plane No. 10. The use of locomotive engines on this level would reduce the expense of working it nearly one half. The two engines, with tenders, would cost, when set up on the road, about $14,000.

The amount required to pay the balance due, up to the 31st of October, on account of motive power, as appears by the supervisor's account, is $9,617 42.

Estimated amount required over and above the supposed receipts, to pay the expenses of motive power, repairing stationary and locomotive engines and machinery, and fitting them for use in the spring, $12,500.

Estimated cost of ropes ordered, and which must be delivered before the rail road can be opened in the spring, $12,000.

Cost of two locomotive engines and tenders for the two western levels of the rail road, $13,000.

Estimated cost of two locomotive engines and tenders for the level at Hollidaysburg, $14,000.

The carrying of passengers is becoming an important branch of the business of transportation. There are now two daily lines of passenger cars running in each direction, and there will be one or two more added next spring. There are nine passenger cars upon the rail road, and four hundred freight cars of all descriptions. Of the latter. a large number are not in a condition to be used with locomotive engines.

No accident has occurred to the passenger cars at the inclined planes this season, and only one to freight cars where merchandize has been damaged. This occurred in consequence of the breaking

of a bad rope. The rope was purchased from William Kerr, of Philadelphia. It had been in use about three months, and was but little worn—it was made of bad materials. The use of the safety car which was introduced last spring, will, I think, if rightly managed, prevent the occurrence of accidents, at all times, except when the the rails are covered with ice. The safety cars that are now in use are heavier than necessary—when they are renewed, their form should be a little changed, and an iron fork with a spring and catch should be added, to give greater security. The safety cars have prevented several accidents during the season, and when properly attached, I believe, have in all cases, except one, stopped the cars which broke loose, or slipped on the main rope.

Respectfully summitted,

SYLVESTER WELCH, Engineer.

NO. 19.

Report of Wilson Knott, Supervisor, on Motive Power.

To Sylvester Welch, Esq.
Principal Engineer of the Portage Railway.

Sir—In conformity with the directions of the board of canal commissioners, I herewith hand you the annexed tables, containing in detail the amount of disbursements, with the amount due for motive power expenses, from the 11th day of May to the 31st day of October, 1835.

Respectfully yours,

WILSON KNOTT,
Supervisor Allegheny Portage Rail Road.

Railway Office,
Johnstown, Oct. 31, 1835.

BEAVER DIVISION.

NO. 20.

Report of Samuel Power, late Superintendent.

To the Board of Canal Commissioners.

GENTLEMEN—In obedience to your request, I have made out and herewith transmit to you, a statement of the amount of expenditures, and amount paid, upon the Beaver division of the Pennsylvania canal, from the 31st day of October, 1834, to the 31st day of March, 1835, at which time the office of superintendent was dispensed with.

The following presents a summary of the expenditures, viz:

Locks,		$2,996 84
Farm bridge,		186 28
Lock houses,		548 64
Bridges,		600 88½
Lock weirs,		455 76
Waste weirs,		52 50
Lock bridges,		258 00
Job contractors,		377 56¾
Damages,		149 28
		$5,625 75¼
Superintendent, Engineers, &c.		2,014 43
Miscellaneous expenses,		95 17¾
Omitted in Report of 1834—		
On lock No. 14,	349 89½	
Making road,	315 46	
Bills & Foreman, per resolution,	2,000 00	
		2,665 35½
		10,400 71½
To which add the amount of expenditures per report,		469,812 47¾
31st October 1834,		480,213 19¼
Whole amount appropriated,		481,341 62
Balance to expend on repairs,		$1,128 43

Respectfully yours,

SAMUEL POWER.

November 20th, 1835.

WEST BRANCH AND NORTH BRANCH DIVISIONS.

NO. 21.

Report of G. Crawford, Superintendent.

To the Board of Canal Commissioners.

GENTLEMEN—In compliance with instructions from the secretary of the board, I herewith submit the following report:—

The legislature, at its last session, authorized by law the construction of a slackwater navigation and towing-path, from the western termination of the West Branch canal, to a point opposite the mouth of Tangascootack; and, for the completion of that work appropriated the sum of $80,000.

The insufficiency of that sum to meet the whole cost of the work contemplated by the act, seemed to forbid the placing under contract any larger portion of it, than the appropriation would cover, or render passable.

When the work now under contract is completed, this branch of the public improvements will then have extended to, and terminated in the coal region, at or near Farrandsville.

Agreeably to the estimate of the engineer, a further sum of $112,215 40 will be required to complete the extension, according to the spirit and provisions of the act authorising that extension. Seventy-nine thousand eight hundred and one dollars and sixty eight and a half cents, will, according to the same estimate, cover the whole costs of the work now under contract.

The whole length of the extension, as authorised by law, is seven miles and one hundred and twelve perches. The whole length of that portion of it at present under contract, is five miles and one hundred and forty six perches. The length of that division of the extension not yet reached, or placed under contract, is, one mile and two hundred and sixty eight perches.

Tabular statement marked letter A., No. 1, shows the amount of work done, per centage retained, amount of moneys paid, printing, stationary, &c.

Tabular statements, marked letter A, No. 2, shows the amount of moneys paid to engineers, superintendent, and other persons employed on the extension and West Branch division of the Pennsylvania canal.

WEST BRANCH DIVISION—PENNSYLVANIA CANAL.

Of the appropiation of last session made to cover estimates of unpaid work upon this division, the sum of $10,308 41 only, has come into my hands; the residue being almost wholly taken up by my predecessor, and applied in the payment of scrips, issued by him on the exhaustion of the previous appropriation, which sum has proved in-

sufficient to pay the back estimates; there still remains to be paid, however, upon estimates remaining in the canal office, and on resolutions of the board in favor of Rankin & Armstrong, and J. & J. Moore, the sum of three thousand five hundred and thirty eight dollars and twelve and a half cents, exclusive of the eight hundred dollars estimated by the engineer as necessary for fencing.

Tabular statement marked letter B, No. 1, exhibits the names of contractors and amount of moneys paid on each item of work done.

Tabular statement marked letter B, No. 2, exhibits the amount of disbursements for new work on old lines.

Tabular statement letter B, Nos. 3 and 4, exhibits the amount of damages paid within the current year, or past year rather, and to whom paid.

NORTH BRANCH DIVISION—WYOMING LINE.

The tabular statements accompanying this report, will exhibit the total amount of disbursements on this line from the first of November, 1834, to the 31st October, 1835, inclusive, to be forty thousand five hundred and eighty-five dollars and thirty-seven cents.

Tabular statement marked letter C, No. 1, exhibits the amount expended on works of construction, in which is included items of small amount for engineering, stationary and printing.

Tabular statement marked letter C, No. 2, exhibits the sum expended in payment of damages upon offers by the board, and awards by the appraisers.

It may be added, that, according to the estimate of the engineer in his report herewith accompanying, a further sum of four hundred dollars will be required on this line to pay for fencing.

I am not in possession of any other facts, nor can I make any other observations which do not strike me as having already come under the notice, or pre-occupied the attention of the board, or that are not already embraced in the accompanying report of the engineer; to which, for more minute and explanatory details, I beg leave to refer you.

All which is respectfully submitted.

GEORGE CRAWFORD,
Superintendent of West Branch and Wyoming Lines, Pa., Canal.

November 21, 1835.

NO. 22.

Tables of Expenditures by G. Crawford.

☞ *For above Tables, comprising the whole of No. 22, see Appendix to 2d vol. of Senate Journal.*

NO. 23.

Report of R. Faries, Engineer upon the North and West Branch Divisions.

To the Board of Canal Commissioners of Pennsylvania.

GENTLEMEN—In compliance with instructions received from your secretary, I herewith furnish you a statement of the condition of the different lines of canal under my charge, with such facts and observations from the engineer department, as are necessary to enable you to complete your report to the legislature.

Susquehanna Division.

This division, during the past summer, has been but slightly interrupted.

It will, however, be necessary, to afford a sufficient depth of water at all times, that the upper level, from the aqueduct at Penn's creek, to the first lift-lock, a distance of nearly three miles below, be sunk at least one foot; and I would also recommend that a feeder be introduced at the head of this level, so as to give a constant influx of water that would not be liable to interruption by the passage of boats.

The dam at Shamokin, and all the locks on the line, are in good condition.

The cost of putting the Susquehanna division in perfect order, will be as follows:

Excavation of bottom, partly slate, 15,840 cubic yds. at 30 cents,	$4,752
Feeder at head—say	1,000
Repairing bridges,	500
Overfall and waste gates at Liverpool,	200
	$6,452

North Branch and Wyoming Divisions.

These divisions have, also, with few exceptions, been in good navagable order during the past season.

In my report to the superintendent, last fall, I directed his attention to the dilapidated state of the locks on the North Branch or old line, and to other matters that it appeared important should be attended to, and advised the policy of procuring materials to replace them whilst every facility was afforded by the improvement. I now wish to draw the attention of the board particularly to this matter, as one that will result in a serious nature—probably the suspension of the whole division for a season, if the legislature longer delay to appropriate a sum sufficient for their reconstruction.

The whole expense of building cut stone locks, would be about fifty-six thousand dollars.

The upper level on this division, also, requires to be sunk abou the same distance and depth as that of the Susquehanna; the presen

guard lock should be substituted for a feeder, and a new guard lock built immediately. If this were done, and water-ways built around the different stop-gates, an abundance of water could be passed to the lower levels at all times, without effecting the navigation of the upper, which at present is sometimes the case.

The sums for the repairs, &c. which appear absolutely necessary, to be done without delay, will stand thus:—

Guard lock and embankments at head,	$15,000
Excavation level, 15,840 cubic yards, at 30 cents,	4,752
Rebuilding 3 bridges, at $250,	750
2 water ways around stop-gates,	500
2 overfalls and waste-gates,	400
Repairing aqueducts,	800
Do bridges,	400
	$22,602

The towing path along the pool of the Nanticoke dam, has never been sufficiently protected; and the frequent floods, owing to the loose alluvial nature of the soil, have in many places considerable portions of it carried off, and in some, destroyed it thoroughly. To prevent any further injury, wherever the alluvial banks occur, rip-raps should be carried up at least eight feet above the surface of low water in the pool of the dam. Six thousand dollars will defray this expense, which added to the sum required for the old line, will make twenty-eight thousand six hundred and two dollars as the sum absolutely necessary to be expended on the North Branch, as early as funds can be provided.

West Branch and Lycoming Divisions.

On the West Branch and Lycoming divisions, but few repairs will be required. From the Muncy hills to Northumberland, during the dryest time last summer, the canal was abundantly supplied with water, and the navigation seldom interrupted by breaches.

On the Lycoming line the breaches were more numerous, but were few to what might have been expected on a new line of so great extent.

The following is an estimate for repairs on the West Branch and Lycoming divisions:

Facing guard-lock at Muncy hills,	$150
Rebuilding three bridges on old line,	600
Repairing bridges,	300
Waste gates on Milton level,	80
Overfall at Tool's run, Lycoming line,	130
Cleaning bottom of canal, whole distance,	400
	$1,660

Recapitulation.

Susquehanna division,	$6,452
North Branch and Wyoming division,	28,602
West Branch and Lycoming division,	1,660
	$36,714

In concluding, I have only to remark, that all the dams, aqueducts, locks and other important works, on the several divisions under my charge, not noticed in the foregoing report, are in a good condition.

Respectfully,

ROBERT FARIES, Civil Engineer.

November 4, 1835.

NO. 24.

Report of R. Faries, Engineer, upon the Tangascootack extension.

To Geo. Crawford, Esq.

Superintendent West Branch Canal.

Sir—The secretary to the board of canal commissioners has directed me to furnish you the necessary information, from the engineer department, relative to the extension of the Lycoming line above Dunnstown, which I herewith respectfully submit.

The extension, as directed by the legislature, was to consist of slackwater, for which purpose the sum of eighty thousand dollars was appropriated, to construct a towing-path along the pool of the Dunstown dam, and to extend the slackwater to a point opposite the mouth of Tangascootack creek. This sum being inadequate to complete the whole distance, it was deemed advisable only to put so much under contract, as the appropriation would place in perfect safety, and at the same time accommodate the Farrandsville trade.

A dam and lock has been built in the vicinity of Queen's run; the dam has seven hundred and thirty feet clear water way, and is seven and one half feet above the comb of the Dunnstown dam. It may not be improper to remark, in this place, that should the improvements be extended above Tangascootack, there will be no serious objection to dams varying from fifteen to twenty and twenty-five feet in height. The dams on the present extension have to conform to arrangements of the Lick run and Tangascootack companies.

The plan of the dam is crib work, filled with stone. The upper slope has five feet horizontal to one foot perpendicular, and is covered with oak spars and backed with stone and gravel; the lower slope has two feet horizontal to one foot perpendicular. The apron timbers extend thirty-three feet under the body of the dam.

The lock is built of dressed stone, laid in courses with cement, and the backing grouted with the same. It has two chambers in a line ninety feet in length each, and twenty-four feet wide; which,

by leaving the centre gate open, is thrown into one single chamber, one hundred and eighty feet in length. By this arrangement rafts of the largest size can pass; and the necessity and expense of a schute is obviated, whilst at the same time the facility with which canal boats can be passed is doubled. Two Pennsylvania, or four Union boats, can be locked through at the same time, neither class requiring more than three or four minutes. If this description of lock should be adopted throughout the whole distance, the West Branch is susceptible of improvement by slackwater, and a connection formed with Clarion river or Sandy lick, tributaries of the Allegheny, I see no reason why boats propelled by steam might not be adopted. In speaking of a connection with the Allegheny, it is not from my own knowledge of the fact that it could be accomplished, as I have never had an opportunity of judging; but it is the impression of many who have, that it is the case, provided extensive reservoirs were established at suitable points. Indeed, should this connection not be practicable by slackwater, I have no doubt but that it will take place by a rail road. The West Branch will then be a leading line, and where the coal business is to be accommodated on both margins of the river, it would seem desirable that some other mode than the tow-rope should be adopted, to prevent collision and confusion between boats passing and those lying to for lading. The necessity of a towing-path, and consequently the expense, could then be despensed with.

The minimum width required for a towing-path, is twelve feet; and where a road interferes, the commonwealth will be obliged to construct it twenty-five feet wide, so as to answer both purposes.—Very little has been done to the path along the pool of Dunnstown or Queen's run dams: it has merely been made passable, and left in that condition for farther operations.

To complete the improvement to Tangascootack, another dam will be required, at a site eighty-four perches above the mouth of Lick run, nine feet high, and six hundred and fifty feet long. The lock to correspond with this dam, has already been founded, and all other work is in a favorable condition for the winter season.

My estimate for work yet to be done, is predicated, principally, on the prices given for what has already been constructed, the cost of which has not exceeded, but rather come below, my estimate made to the board previously to the work being put under contract.

The following estimates show clearly the situation of the work as it now stands: that portion put under contract, will be completed again the first day of December.

Work under Contract and Done.

Section No. 1, final—John Moorhead, contractor.

Grubbing and clearing,	$250 60	
Excavation, 85 cubic yards, at 11 cents,	9 35	
Embankment, 7165 cubic yards, at 14,	1,003 10	
Rip-rap, 606 cubic yards, at 37½,	227 25	
		$1,489 70

Section No. 2, final— ———, contractor.

Grubbing and clearing,		160

Section No. 3, final— ———, contractor.

Grubbing and clearing,	20 00	
Excavation, 539 cubic yards, at 11 cents,	59 29	
Rip-rap, 180 cubic yards, at 33,	59 40	
	———	138 69

Section No. 4, final— ———, contractor.

Grubbing and clearing,	150	
Excavation, 3087 cubic yards, at 7 cents,	216 09	
Embankment, 1536 cubic yards, at 11½,	176 64	
Rock, 12 cubic yards, at 37,	4 44	
Rip-rap, 702 cubic yards, at 37,	259 74	
Do. sec. stone, 229 cubic yards, at 15, (est.)	34 35	
Wooden culvert, (estimated,)	40	
	———	881 26

Section No. 5—John Shaw, contractor.

Grubbing and clearing,	150	
Excavation, 7300 cubic yards, at 12 cents,	876	
Embankment, 812 cubic yards, at 12,	97 44	
Rip-rap, 900 cubic yards, at 15, (estimated,)	135	
Culvert, do.	15	
Heavy paving, 67 perches, at 75, do.	50 25	
	———	1,323 69

Lock No. 1—M'Murtrie & Packer, contractors.

Stone work, 3602 perches, at $4 00,	14,408	
Excavation above water, 8215 cubic yards, at 15 cents,	1,232 25	
Do. below water, 5887 cubic yards, at $1 00,	5,887	
Lock bottom,	1,600	
Lock gates,	600	
Puddling, 1200 cubic yards, at 20 cents, (est.)	240	
Sheet piling, do.	280	
Cutting stone quoins,	70	
Iron extra, 6500 pounds, at 8 cents, do.	520	
Bridge over lock,	40	
	———	24,877 25

Lock section No. 1—M'Murtrie & Packer, contractors.

Grubbing and clearing,	50	
Excavation, 11,000 cubic yards, at 12 cents,	1,320	
Embankment, 6000 do. at 15	900	
Rip-rap, 2520 do. at 45	1,134	
	———	3,404

Dam No. 1—Thos. C. & William Parsons, contractors.

Lineal feet, 730,	at $26	00	18,980	
Abutment walls, 860 perches,	at 3	50	3,010	
Excavating foundation, 1200 cubic yards,	at	50	600	
Abutment filling, 4010 cubic yards,	at	30	1,203	
Timber under abutment, 1340 lineal feet,	at	10	134	
Iron extra, 6 tons, at $160,	(estimated,)		960	
Rip-rap, heavy, 380 perches, at 80 cents,	do.		304	
				25,191

Dam section No. 1—T. C. & W. Parsons, contractors.

Grubbing and clearing,			100	
Excavation, 23,000 cubic yards,	at $0	12½	2,875	
Embankment, 6460 do.	at	16	1,033	60
Slope wall, 452 perches,	at 1	50	678	
Pier head-wall, 896 do.	at 2	50	2,240	
Rip-rap, 6120 cubic yards,	at	48	2,937	60
Oak timber in pier head, 700 lineal feet, at	12		84	
				9,948 20

Bridge on dam section No. 1—Thos. C. & William Parsons, contractors.

Wall, 540 perches, at	$1	75	945	
Excavating foundation, 309 cubic yards, at		40	123	60
Superstructure,			300	
Timber and plank in foundation, (estimated)			40	
				1,408 60

Lock No. 2—Bowes & Eustace, contractors.

Excav. above water, 3700 cubic yards, at	$0	20	740	
Do. below water, 1600 do.	at	60	960	
Wall, 800 perches,	at 4	00	3,200	
Timber in bottom, 7160 lineal feet,	at	10	716	
Plank, board measure, 67,000 do.	at 12	00	804	
Puddling, 900 do.	at	20	180	
Three mitre sills, (estimated)	at 40	00	120	
				6,760
Castings for lock No. 1,				550
100 rods of fence, at $1 00				100
Lock house for lock No. 1, not under contract yet,				500
				76,732 39
Add four per cent. for contingencies,				3,069 29½
Total cost for work put under contract,				$79,801 68½

Estimated Cost of completing to Tangascootack Creek.

Section No. 1—length, 1 mile, 128 perches.

Excavation, 17,000 cubic yards, at 10 cents,	$1,700	
Do. rock, 1,000 cubic yards, at 50 cents,	500	
Embankment, 15,000 cubic yards, at 15 cents,	2,250	
Rip-rap, 8,000 cubic yards, at 40 cents,	3,200	
		$6,120

Section No. 2—length, 1 mile, 148 perches.

Excavation, 1,000 cubic yards, at 10 cents,	$100	
Embankment, 5,000 cubic yards, at 15 cents,	750	
Rip-rap, 3,500 cubic yards, at 40 cents,	1,400	
		2,250

Section No. 3—length, 216 perches.

Excavation, 8,700 cubic yards, at 12 cents,	$1,044	
Do. rock, 4,200 cubic yards, at 50 cents,	2,100	
Embankment, 1,600 cubic yards, at 15 cents,	240	
Rip-rap, 3,400 cubic yards, at 30 cents,	1,020	
		4,404

Section No. 4—length, 1 mile, 4 perches.

Excavation, 3,000 cubic yards, at 10 cents,	$300	
Embankment, 12,000 cubic yards, at 15 cents,	1,800	
Rip-rap, 9,800 cubic yards, at 40 cents,	3,920	
		6,020

Section No. 5—length, 264 perches.

Excavation, 12,000 cubic yards, at 12 cents,	$1,440	
Embankment, 11,000 cubic yards, at 15 cents,	1,650	
Rip-rap, 3,500 cubic yards, at 30 cents,	1,050	
		4,140

Lock No. 2.

Wall, 2,800 perches, at $4,	$11,200	
Gates,	600	
Castings,	550	
Puddling, 1,000 cubic yards, at 20 cents,	200	
		12,550

Lock, section No. 2—length, 60 perches.

Grubbing and clearing,	$50	
Excavation, 1,000 cubic yards, at 10 cents,	100	
Embankment, 37,400 cubic yards, at 15 cents,	5,610	
Rip-rap 7,000 cubic yards, at 30 cents,	2,100	
Bridge at Lick run,	1,500	
		9,360

Dam, section No. 2—length, 48 perches.		
Grubbing and clearing,	$100	
Embankment, 26,500 cubic yards, at 15 cents,	3,975	
Rip-rap, 5,400 cubic yards, at 30 cents,	1,620	
Pier head-wall, 1,200 perches, at $2 50,	3,000	
Guard gates,	4,000	
Slope wall, 300 perches, at $1 50,	450	
Two small bridges,	100	
		13,245
Dam No. 2.		
Lin. feet, 650, at $35 per foot,	$22,750	
Wall in abutments, 1,100 perches, at $3 50,	3,850	
Excav. foundation, 1,200 cubic yds. at 40 cts.	480	
Filling abutments, 4,000 cubic yds. at 30 cts.	1,200	
Heavy rip-rap, 400 perches, at 80 cents,	320	
		28,600
Section No. 6—length, 228 perches.		
Excavation, 11,600 cubic yards, at 10 cents,	$1,160	
Embankment, 6,400 cubic yards, at 15 cents,	960	
Rip-rap, 7,520 cubic yards, at 25 cents,	1,880	
Grubbing,	200	
Bridge at Gray's run,	700	
		4,900
Section No. 7—252 perches.		
Excavation, 15,000 cubic yards, at 12 cents,	$1,800	
Embankment, 11,900 cubic yards, at 15 cents,	1,785	
Rip-rap, 4,160 cubic yards, at 25 cents,	1,040	
Grubbing,	300	
		4,925
Lock house at lock No. 2,		500
		$97,014 00
Engineering and office expenses,		5,000 00
		$102,014 00
Ten per cent. for contingencies,		10,201 40
		$112,215 40

The length of the extension is seven miles, one hundred and twelve perches; and lockage, sixteen feet six inches.

During the past season, a weigh-lock has been completed at Northumberland, which has cost, including weighing apparatus, twelve thousand seven hundred and ninety-eight dollars and eighty-four cents; and at present a building is being built over it, which will cost eight hundred and fifty dollars. A dwelling will also be required for the weigh-master, and may be set down at one thousand six hundred and fifty dollars.

On the Lycoming and Wyoming lines, twelve hundred dollars will be required to settle up fence estimates, which does not appear to have been taken into consideration heretofore—eight hundred dollars for the Lycoming line, and four hundred for the Wyoming line.

ROBERT FARIES, Civil Engineer.

Nov. 8, 1835.

DELAWARE DIVISION.

NO. 25.

Report of Simpson Torbert, late Superintendent.

PENNSYLVANIA CANAL,
Office of the Delaware Division, Nov. 1, 1835.

To the Board of Canal Commissioners.

GENTLEMEN—Agreeably to your instructions, I respectfully report that I have disbursed, out of the "*old work fund*," during the past year, the sum of $492 77, as follows, viz:

To King & Livingston, for cast iron paddle gates,	$350 00
To Courtland Yardley, for making fence,	51 77
To Simpson Torbert, for services as superintendent,	91 00
Amount,	$492 77

I have also paid damage claims as follows, viz:

To James Van Hart,	$40 00	offer of Commissioners.
John Pidcock,	10 00	do.
Isaac B. Williams,	475 00	award of Appraisers.
John Mill,	35 00	offer of Commissioners.
Banner Knowles,	15 00	do.
John Kirkbride,	80 00	award of Appraisers.
Thomas Stockham,	40 00	do.
Anthony Burton,	50 00	do.
George W. Richards, executor of H. L. Waddel, deceased,	200 00	do.
Isaac Stem,	10 00	do.
Godfrey Raub,	40 00	do.
George Trauger,	40 00	do.
John Otto's heirs,	75 00	do.
Christopher Medler,	150 00	do.
Lewis S. Coryell,	180 00	offer of Commissioners.

To Magdalen P. Swift,	400 00	award of Appraisers.
Elias Ely,	25 00	do.
Charles Taylor's estate,	3 50	do.
Paid for recording deeds,	4 62½	
Amount	$1,873 12½	

All of which is very respectfully submitted.

SIMPSON TORBERT, *Superintendent.*

FRENCH CREEK AND BEAVER DIVISION.

NO. 26.

Report of Sylvester, Welch, Engineer.

Harrisburg, December 21, 1835.

THOMAS S. CUNNINGHAM, Esq.
Speaker of the Senate.

SIR—The board of canal commissioners transmit herewith to the Senate, a report, which has just been received, of Sylvester Welch, Esq., engineer, relative to the injuries upon the Beaver and French Creek divisions of the canal, occasioned by the late floods.

I am, respectfully,

JAMES CLARKE, President.

Engineer's Office, Johnstown, December 10th, 1835.

To JAMES CLARKE, Esq.
President of the Board of Canal Commissioners.

SIR.—Since my last communication to the board, I have examined the Beaver and French Creek divisions of the Pennsylvania canal, for the purpose of ascertaining the character and extent of the injuries occasioned by the late high freshets, and of giving such plans and directions for repairs and modifications, to the officers who have charge of the work, as might be considered necessary to put the canals in a condition for use, and to render them permanent.

Beaver Division.—The injuries sustained by this canal are as follows:—

The towing-path along the pool of the Shenango feeder dam was worn down by the water at various points, from one to two or three

feet. There is no place worn so deep as to prevent horses, drawing boats, from passing over it.

The embankment between the west end of the bridge at Newcastle and the high ground, in length a little more than two hundred feet, was carried away, and the water of the river now passes through the breach, having formed for itself a channel which connects with the old one below the dam.

A part of the bank for the protection of the boat channel below the lock at dam No. 2, was washed away, and the chanuel partly filled up. The embankment and protection wall, on the river side of the lock, were nearly all carried away. A deep excavation has been made by the water, below and adjoining the east end of the dam, and the contiguous abutment. The end of the dam has settled about six inches.

Two of the piers of the towing-path bridge over the Conequenessing, were so much injured that it will be necessary to take them down and rebuild them.

At dam No. 4, about four hundred feet in length, of the embankment between the dam abutment and the lock, was washed away, and the loose material all removed down to the rock.

The towing-paths along the pools are more or less abraded, but the injury at any one point is inconsiderable.

In repairing the towing-path along the Shenango pool, and on other parts of the line where the water in high floods overflows the adjacent bottom lands, the supervisor has been advised to make passages through the towing-path, by culverts, at points where the ground behind it is low, so that the water, as the river rises, may pass through and maintain the same level on both sides of the bank. The parts of the towing-path which have been washed away have been directed to be rebuilt with coarse gravel, slate, or other heavy material: and such parts of the banks as are made of light material, and exposed to a strong current, are to be covered with coarse gravel or small stones on the top. The faces of the towing-paths where they are not covered by a wall, are found to be too steep to maintain their slope when exposed to the current, or to waves produced by the wind on the pools. Where the washing away renders it necessary to make repairs, directions have been given to move back the line of the horse-path, and cut off the upper angle of the bank, so as to give the face a flat slope. To do this, it will be necessary in some cases to remove fences to obtain the requisite width for the horse-path.

The guard bank and works about the feeder dam, are found to be too low to give security to the village of Newcastle, and protection to the canal below the guard lock. During the late high freshet, the water rose to the top of the bank, and would have passed over it, and seriously injured or perhaps destroyed a portion of the town and the canal below, had a passage not been made around the west end of the bridge. I have directed the head of the guard lock and the east abutment of the dam to be raised one foot, and the guard bank from the head of the lock to a point above the town, where an embankment is to be extended to the hill, to be raised two feet higher than

the head of the lock, and made with a flat slope on the side next the town. A crib has been directed to be built below and adjoining the east abutment of the dam.

At dam No. 2, a crib has been directed to be built below the east abutment, and along the back of the lock wall. The portion of the deep excavation, not filled by the crib work, is directed to be filled with large stone. The portion of the dam that has settled, will be raised a few inches above its original height. The bank, for the protection of the boat channel, is directed to be re-built with loose stones, laid so as to form a flat slope on the river side.

The piers of the towing-path bridge, over the Conequenessing creek, are directed to be re-built partly with new stone. The walls are to be secured together with iron bolts and cramp irons.

A coffer dam has been built from the abutment across the head of the canal, at dam No. 4, and a crib has been commenced along the whole extent of the breach, far enough back from the centre of the canal, to admit of a bank of earth on the inside. The crib will be raised, at present, two and a half feet higher than the weir of the dam. A wall has been directed to be built on the outside of this crib work, to be commenced upon the solid rock, and carried up four feet above the weir of the dam. The bank, on the inner side, will be raised with gravel, to the height of the wall. It will be necessary to build a guard gate to be connected with the abutment of this dam, in order to protect the canal from injury during very high floods.

The river wall, below the abutment of the dam, at Bridgewater, is apparently yielding to the pressure of the embankment on the inside. It cannot well be re-built, until the period of low water in the Ohio river, next summer. If it continues to give way, the supervisor is directed to secure it, temporarily, until the river becomes low enough to rebuild it.

The wall on the land side of the lock, at dam No. 2, has been pressed in, about five or six inches. It appears to have stood as it is, for nearly a year, without any change. As the lock is reduced about six inches in width, it will be necessary to take down the wall and re-build it, in order to make the lock correspond with the others on the line.

Estimated cost of repairing the Beaver division, raising the banks, &c. about the feeder dam, and building guard gates.

Repairing towing path along the Shenango pool, repairing breach near feeder dam, raising embankments and work about dam, and securing abutments,	$4,255
Building crib and securing east end of dam No. 2, rebuilding embankment and wall back of lock, and rebuilding bank for the protection of the boat channel,	2,530
Repairing Conequenessing bridge,	350
Repairing breach at dam No. 4,	3,332
Building guard gates,	2,000
	$12,467

This division of the canal was opened for navigation about the 25th of March, and continued navigable, with very little interruption, until the 22d of October. Boats commenced running again about the 8th of November, on all parts of the line between Newcastle and the Ohio, except at the breach at dam No. 4, where there was a short portage. This breach is probably so far repaired, that boats could pass it at this time, if the canal was openi but it will require some time to construct all the works necessary to render the place secure. To repair damages at the Concquenessing bridge, at dam No. 2, and at Newcastle, and raise the walls and embankments so as to render them secure from injury in future, will require the employment of a large force, during the whole winter. At dam No. 2, and at Newcastle, further injury may be apprehended from the spring floods, if the damage already done shall not have been repaired, to a considerable extent, before the breaking up of the rivers in spring.

If the repairs are prosecuted vigorously, the whole line can be opened for navigation as early in the season as the weather will permit.

French Creek Division.

The principal damage done on the feeder line, was the breaking down of the aqueduct, near Cullum's saw-mill, the washing away of the earth below the east abutment of the feeder dam, near Bemis' mill, and some slight washing away below the west abutment.

On the line between the aqueduct over French creek and Franklin, (Franklin line,) dam No. 2 has sustained some injury in the timber work, and the earth and protection wall are washed away below the abutments. Dam No. 3—the earth and protection walls below the abutments are washed away; the timber work and abutments are not injured.

Dam No. 4—entirely destroyed—nearly one half carried away; the part that remains has settled down so much as to render it useless, except so far as the timber which can be taken from it, can be made available. The abutment on the end of the dam, next to the lock, is partly fallen down, and the lock bank is all washed away. The abutment, at the opposite end of the dam, and the crib below it, have settled down considerably. Dam No. 5—a deep excavation is made below the abutment—lock embankment all washed away, and a portion of the guard bank, below the lock, has been washed into the boat channel. Dam No. 6—lock embankment partly washed away—the guard bank, between the south end of the dam and the high ground, is washed away on a distance of about two hundred feet, and the water of the river now passes through the breach—the dam and abutments are not injured. Dam No. 7—the earth and protection wall below the abutments, are washed away to a considerable extent—lock embankment partly washed away. Dam No. 8—the protection wall below the abutment, on the canal side, and the lock bank are washed away: a deep excavation is made below the abutment—dam not injured. Dam No. 10—the protection wall and the embankment of the lock, on the side toward the river, is all washed

away; also a part of the adjoining canal bank. The current has excavated a deep place below the abutment, and under where the lock embankment stood. Dam No. 11—a deep excavation is made below the abutment on the canal side—the embankment on one side, and a part of the foundation of the lock, were carried away, and about three-fourths of the lock wall, of one side, was thrown down. About two hundred feet of the canal, below the lock, is also carried away.

The water passed to a greater or less depth over all the towing paths. Along some of the pools, where there is a good deal of low ground behind them, they are badly washed, and in some places breaches of considerable extent are made entirely through the bank.

The canal, between the pools of dams Nos. 2 and 3, was considerably injured by the water passing over the low parts of the embankments. There was, however, no serious breach.

For repairing the aqueduct on the feeder line, near Cullum's sawmill, a new superstructuure of wood, upon the same general plan as the old one, but built stronger, is now in progress of construction—it can be completed before the opening of the navigation next spring.

A crib has been directed to be placed in the deep excavation below the east abutment of the feeder dam, near Bemis' mill. It will be raised to the surface of water below the dam. The space behind and below it will be filled with loose stones. This crib will prevent the undermining of the abutment and end of the dam. Whatever other work may be necessary for the protection of the natural bank, mill-race, &c. it is supposed will be done by the owner of the mill.

The embankments, &c. on the feeder line, will require but little repair. In some cases, where the towing path bank stands upon an inclined surface of quick sand, it slides out, or sinks, and it becomes necessary to raise and widen it.

In securing the dam abutments on the Franklin line, the supervisor has been directed to build a crib below each, from fifteen to twenty-two feet wide, and of such depth and length as will fill the deep part of the excavation. When the crib-work is raised to the surface of the water, a line of piles is to be driven along the face toward the river, as deep as they can be conveniently, with a pile-engine. The spaces in the cribs are to be filled with loose stones. Upon the crib-work thus built, a wall will be raised, where stone can be conveniently procured, high enough to protect the lock embankment; and when they cannot, crib-work will be substituted for the wall. This kind of security will be required for the abutments of dams Nos. 1, 2, 3, 5, 6, 7, 8, 10, and 11. At some of the dams very small cribs only will be required.

The foundation for the new part of the lock at dam No. 11, is prepared, and a part of the wall is laid. The stone, for the remaining part, is cut and ready to lay as soon as the weather will permit. The canal, below dams Nos. 11 and 10, can be rebuilt in two weeks of favourable weather.

The breach in the guard bank, at dam No. 6, could be repaired, if prosecuted vigorously, in a month or six weeks. It can be done

during the winter season. Directions as to the manner of rebuilding the embankment, have been given to the supervisor.

To repair the damages at dam No. 4, will require a new dam and new abutments. If built, they should be put into the deep water, immediately below the old dam. The foundations of the new abutments should be sunk as low as practicable, and well piled. The cost of the dam and abutments, if built upon a plan that would render them permanent, would be from twelve to fifteen thousand dollars. The bottom lands, which lie along the shores of the pool of this dam, are low, and a portion of them are covered with water at all times when the pool is full. The remaining parts are rendered nearly useless, by being subject to inundation by every freshet. These grounds cannot be drained and rendered fit for cultivation if the dam is rebuilt.

I have directed Mr. Hoops, the assistant engineer, to make a survey for a canal, from the lock at dam No. 3, along the foot of the upland, to a point a little below the lock at dam No. 4. The ground lies favorably, for the construction of a canal. I am of opinion, that the making of this canal, and the removing of the lock to the proposed point of intersection with the towing path of the pool of dam No. 5, will cost less than the re-building of the dam: the flooded ground would be reclaimed, and the navigation would be safer and less liable to interruption. The work could be done during the next summer, without interrupting the trade on the canal.

The towing paths along all the pools, are too low by two or three feet. The supervisor has been advised, provided the canal commissioners consent to it, to raise them with gravel, to the required height next season. If they are permitted to remain as they are now, with regard to height, the navigation will be suspended for several days by every considerable freshet.

There are no regular built boats on this division. All the produce &c. conveyed upon the canal, is carried in flat boats adapted to the navigation of the Allegheny river, and they are used, only, when the river is high enough for descending boats to pass. The trade has been suspended altogether, since the 22d of October. Boats can pass from the feeder dam at Bemis' mill, when the water is high enough to navigate the Allegheny, down as far as dam No. 10. At No. 4, they can pass down the natural channel and through the breach in the dam. This could be done, during the whole of next season, if it should be determined to build a new canal. At No. 6, there will be water enough, in a moderate freshet, to pass through the lock. The only serious obstacles to the passage of descending boats, are at dams Nos. 10 and 11. The injuries at these points, could be so far repaired, in a few days of good weather, that boats could pass, if the supervisor was furnished with means to pay the expenses. The citizens along the valley of French Creek, would then have the advantage of a descending navigation, of which they were deprived during the season of the fall trade. The preservation of the works along the whole line, however, require that the damages, particularly at the dams, except No. 4, should be repaired

as soon as possible, and there can be no ascending trade until this is done.

The work at the waste-weirs, and at the new bridge over the feeder where it cross the turnpike road leading from Meadville to Mercer, cannot be finished until funds are provided to pay the expenses.

Estimated expense of repairing the Canal, raising the Towing-Path, &c.

Aqueduct at Cullum's mill,	$450
Turnpike bridge (rebuilding,)	510
Crib at feeder dam,	250
Repair at dam No. 1,	500
Do do No. 2,	500
Do do No. 3,	600
Making canal and rebuilding lock at dam No. 4,	10,000
Repairs at dam No. 5,	600
Do do No. 6,	2,000
Do do No. 7,	900
Do do No. 8,	900
Do do No. 10,	1,400
Do do No. 11, and rebuilding a part of lock,	3,500
Raising towing-paths,	13,300
	$35,410

All which is respectfully submitted,

SYLVESTER WELCH, *Engineer.*

☞ *For all the Tabular Statements accompanying the foregoing Reports, see 2d Appendix to vol. Senate Journal.*